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FARMER-LED INNOVATIVE TECHNOLOGIES OF HAILAKANDI DISTRICT

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Preface

Farmers in developing countries have excellent knowledge of agriculture and natural resource management, which are recognized to be more eco-friendly and sustainable. Farmer's innovation is a unique idea arises out of vast practical experience and technical knowledge. Such innovations are generally based on locally accessible and available natural resources and they are gaining more and more significant day by day for its sustainability. Therefore, a pioneering effort was made to promote and document the farmers' innovation to promote eco-friendly, location specific and low cost technologies of the district.

This publication comprises of seventeen numbers of innovative technologies of farmers of the district. We hope that, this effort in the form of publication in a systematic and organized manner will surely help in identifying innovative farmer and their innovations and sharing further with researchers, agro entrepreneurs, policy makers and extension functionaries for large scale application, standardisation and improvisation.

We are highly thankful to all staff of KVK Hailakandi for their immense support in bringing out this publication.

Hailakandi

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Introduction

Farmer's innovation is a new idea, practice or object and it reflects the age old experience, technical knowledge and intuitiveness of the farmer. It plays an important role in optimizing resource utilization. Farmers in developing countries have excellent knowledge of agriculture and natural resource management, which are recognized to be more eco-friendly and sustainable.Such innovations are generally based on locally accessible and available natural resources and they are gaining more and more significant day by day for its sustainability. Therefore, such technologies must be investigated and promoted.

In this context, KVK Hailakandi has done pioneering investigations in the district to gather technologies adopted by the farmers and farm women and to document farmers' innovation to promote eco-friendly, location specific and low cost technologies of the district.

A total of sixteen numbers of innovative technologies of farmers of the district have been documented in this publication. The selected innovations have been documented and presented in uniform format giving the details of the technology and its utility with suitable photographs.This publication is expected to provide and share eco-friendly and sustainable innovative technologies with the farming community and other researchers, agro entrepreneurs, policy makers and extension functionaries.

CHAPTER I

VALUE ADDITION– INSTANT KHEER MIX

Introduction

Kheer which is also known as *Payasam* is one of the most famous and authentic milk based dessert in India. Desserts are always an integral part of Indian cuisine, with milk base desserts being a predominant feature. Kheer is milk based Indian dessert and is prepared by the partial dehydration of whole milk usually with sugar and rice. It is the traditional dish, very nutritious and highly preferred by the people of the district; still it is prepared only on auspicious and special days because of its lengthy and tedious method of preparation. The process requires long time soaking of base (rice), continuous stirring as well as attention for long period of time. To combat with these problems a farm women have developed an innovative technology of instant kheer preparation.

Instant kheer mix is an innovative technology developed by a farm woman which is basically the base for making kheer (*payasam*). Through this kheer mix, kheer can be made within (15 – 20 minutes) in comparison with other kheer bases (boiled rice: 35 - 40 minutes, soaked rice: 40- 45 and rice: 60 - 65 minutes) with less drudgery. The base prepared is preservative free and can be stored for more than one year when packed in airtight polypropylene bags.

Methodology

The instant kheer mix was prepared by adding refined oil to the refined flour and making dough with cold water. Then shape the dough manually into approximately 0.8 cm long and 0.2 cm thick structures. These are then sun dried for 2 – 3 days by spreading as a thin layer over a cloth and covering with a transparent plastic sheet. The mix prepared were packed in airtight polypropylene bags and stored as ready-to-use kheer mix.

Practical Utility

- Reduces time of preparation
- Reduces drudgery

- Reduces fuel consumption
- Highly sensory acceptable

Manual preparation of instant kheer mix

Drying of instant kheer mix

Final product

Kheer prepared from instant kheer mix

CHAPTER II

VALUE ADDITION– ROSELLE JAM

Introduction

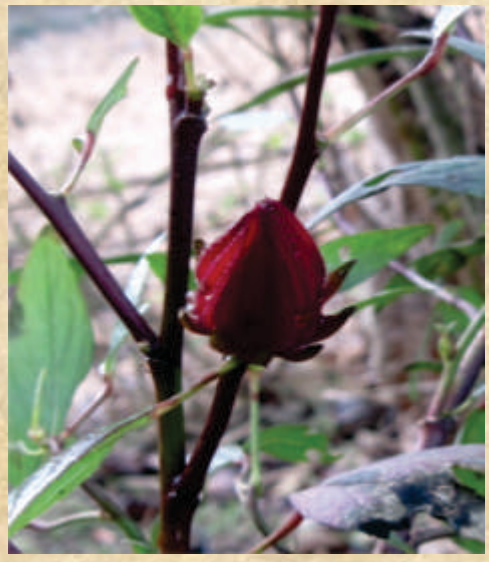
It is a nutritious fruit jam prepared from the pulp of roselle. This can be used as spread with bread/ Chapati during breakfast. It is a good source of carbohydrate and essential minerals. It can be prepared at every household with minimum input.

Methodology

It can be prepared by pulping the crimson coloured calyx of roselle and then heating at low flame to the required consistency without adding any acid, pectin, flavour or colour externally.

Practical Utility

- Highly nutritious
- Can be prepared easily
- Can be stored for one month without adding any artificial preservatives



Roselle Plant

Roselle Jam

CHAPTER III

VALUE ADDITION– MANGO FRUIT LEATHER

Introduction

Mango leather is a form of processed product which can be used in the form of a confectionary item. The mango fruits which are bruised and discarded can be utilized to make this product.

Methodology

It can be prepared by pulping the ripened mangoes and heating at low flame with sugar up to required consistency and then plating to a thin film over plates with a thickness of 0.2 to 0.3 cm. Then the plates are sun dried till its stickiness ends and comes out of the plate easily without any effort.

Practical Utility

- It adds value to the product
- Reduces loss of fruits
- Increases shelf life
- Adds variability to the food product

Mango Fruit Leather

CHAPTER IV

VALUE ADDITION IN MURTA PLANTS

Introduction

Murta (*Clinogyne dichomata*) belongs to the Marantaceae family and is of immense significance in Barak Valley Zone. The cane (stem) of *murta* plant is the raw material for making the most important value added product shital pati, a traditional bed mat in Eastern India and Bangladesh. Shital pati has a cooling effect and thus the mat is spread on the floor or on the bed especially during summer. Moreover, many other value added products are derived from the *murta* plants which includes file cover, ladies hand bags, purse, mobile cover, bottle carrier, hand fans etc.

Methodology

In conventional method of preparation of shital pati, several steps are involved to get the finished product. The steps involved are cutting or harvesting of the matured stem (cane), followed by splitting of the stem, soaking it in water for 1-2 hours, separation of the bark/skin (raw material) by peeling, drying of the bark and weaving of the mat. The unused portion, i.e., the strips from the pith derived after final separation is used as binding/tying material. For more lustrous and durable mat, the farmers boil the bark for 2 hours before drying. Similarly, other value added products are also produced by weaving mat of required size and then stitching with other accessories which adds value to the final product.

Practical Utility

They form the base in developing entrepreneurs and setting up small-scale cottage industries leading to boosting the economy of the farmers of the particular region.

Stem of murta plant

Murta plant

Peeling of the stems of murta

Weaving of shital pati

Value added products from murta plant

CHAPTER V

FOOT MAT– VALUE ADDITION OF HOUSEHOLD WASTE CLOTHES

Introduction

Every household has clothes which are not utilised after they are worn and torn out and these cloths are considered as household waste materials. These waste clothes can be reused and value added to products like foot mat. Foot mats are essential part of each household which helps in maintaining cleanliness in the house.

Methodology

For making foot mats, plastic mats with large size wholes are cut into required size and then waste cloths like t-shirts are cut into small pieces of 1 cm width and 5 cm length. The cut cloths are tied into the mats by making knots from back side.

Practical Utility

- Helps in maintaining cleanliness at home
- Waste cloths can be reused and value added
- Very low cost

Foot mat- Value added products from household waste clothes

CHAPTER VI

POULTRY CARRIER – CHIKA

Introduction

Carrying of poultry birds to and fro from the local markets of villages involves drudgery and there is a maximum probability of getting injuries by the poultry birds while carrying. To combat with this, farmers out of their age old experience have designed *Chika*.

Chika is an innovative, short distance, humane poultry carrier that reduces drudgery in carrying of poultry birds without being any physical or mechanical injury to the poultry bird. The design of the structure reduces effort as well as grip fatigue required in carrying poultry from local market and thus reduces drudgery of poultry carrying.

Methodology

It is a very low cost carrier made easily with locally available wild cane locally known as *murta* or with tender bamboo within few minutes with very less effort. The quality of *murta* or tender bamboo used will decide the strength of the *Chika* that will be used for carrying poultry birds of different weight. The structure consists of a circular ring supported with four flexible holders, tied at an equal distance with each other and are tied together again at the top. The design of the structure provides easy handling as well as it can be easily carried while ridding any two wheelers.

Practical Utility

- Reduces the drudgery involved in poultry carrying
- Very less physical or mechanical injury to the bird
- Low cost structure

Making Chika with murta plant

Farmer carrying poultry in Chika to the market

CHAPTER VII

LOW COST RAIN WATER HARVESTING SYSTEM

Introduction

Barak valley is rain fed and the population of the valley in the rural and especially the people residing in the hilly areas completely depend on rain water for their various household activities. They have to travel many kilometres, just to meet the household requirement of water and there is a hue and cry in these areas during the dry spell. To combat with this, farmers out of their age old experience and knowledge have designed a very low cost rain water harvesting and storage structure. Rainwater harvesting is the accumulation and deposition of rainwater for reuse before it reaches the aquifer.

Methodology

A rainwater harvesting system comprises components of various stages – catchment of rain water, transporting rainwater from the catchment area to the storage tanks and storage in tanks. The catchment area receives the rain water and the channels attached all around the edge of the sloping roof, collect and transport rainwater to the storage tank through conduit. The collection of rainwater in the gutter and its transport to the tank uses the general principle of gravity. The catchment area is always cleaned in the beginning of rainy season or the first harvest of water is drained off as the cleanliness of the harvested water depends on the cleanliness of the catchment area. The storage tanks are also cleaned up before storing the harvested water.

Practical Utility

- Rain water can be harvested, stored and then can be utilised at very low cost
- Once constructed, it lasts up to 3 years.

Low Cost Water Harvesting System

CHAPTER VIII

LOW COST WATER STORAGE STRUCTURE

Introduction

Hailakandi is a rain fed district where the population of the district depends on rain water. Therefore, storage of rain water is very much important to meet up their regular water requirements. The technology involves the use of locally available and low cost materials for making water storage structure.

Methodology

It is the storage tank, where harvested water is stored for further use. The storage tank is placed at an elevated area to take advantage of gravity flow. The cost for constructing tank varies depending on the size. It is made up of bamboo, gunny bags and plastic sheet.

Practical Utility

- Low cost structure
- Once constructed, it lasts up to 4-5 years.

Low Cost Water Storage Structure

CHAPTER IX

ECO–FRIENDLY INSECT PEST MANAGEMENT IN POTATO CULTIVATION

Introduction

Introduction of high yielding varieties, practice of monoculture and indiscriminate exploitation of natural resources and injudicious use of chemical fertilizers and pesticides leads to soil degeneration, insect pest outbreak, human health and environmental hazards. Hence, there is a need to reduce their ill effects. Thus, future strategies for increasing agricultural productivity will have to focus on using eco-friendly management practices for controlling insect pests and improving soil health status more efficiently, effectively and sustainably.

It is observed that potato is an important tuber crop cultivated popularly by almost all the farmers of the district in small or large scale. They generally prefer the local potato varieties for cultivation and its storage as seeds. During this, they face various insect pests and disease related problems. Keeping these facts in mind, effective and eco-friendly pesticide was developed by the farmer for controlling insect pests and diseases.

Methodology

Eco-friendly pesticide mixture preparation developed by the farmer was named as *Rasayanik*. It was prepared by extracting solution of tobacco leaves in an earthen pot and adding cow urine and crushed leaves of akond (*Calotropis procera*) and ghatkund (*Clerodendrum infortunatum*). The mixture is then sealed with transparent plastic and kept in pit with surface exposed to sun light for 20 - 25 days. The filtered solvent is used @10% as pesticide.

Practical Utility

- Effective against red ants, aphids, potato tuber moth, cut worm, white grub etc.

- Effective against potato blight in field condition
- surface borne and fungal diseases was effectively controlled with seed dip treatment of potato seeds in 10 % of *Rasayanik*

Preparation of eco-friendly pesticide- Rasayanik

Covering with transparent plastic for keeping in pit and filtration of the solution after taking out of the pit

CHAPTER X

ORGANIC NUTRIENT SUPPLEMENT FOR POTATO CULTIVATION

Introduction

Injudicious use of chemical fertilizers leads to soil degeneration, human health and environmental hazards. Hence, there is a need to reduce their ill effects. Thus, future strategies for increasing agricultural productivity will have to focus on using eco-friendly management practices like organic nutrient supplement for improving soil health status more efficiently, effectively and sustainably. Since, potato is an important crop cultivated by the farmers of the district, organic nutrient supplement (*Amrit pani*) was developed by the farmer.

Methodology

It can be prepared by mixing cow dung and cow urine properly and then adding ghee, heeng, turmeric powder and amla. All the components were mixed properly and the mixture formed must be applied @ 15 days interval.

Practical Utility

Amrit pani is an alternative to inorganic fertilizers that revealed effective growth and development of crop as well as tubers.

Effect of application of Amrit pani on potato field

CHAPTER XI

POTATO SEED STORAGE TECHNOLOGY

Introduction

Farmers of the district prefer local potato varieties for cultivation and its storage as seeds. During this, they face problems due to various storage insect pests and disease like fungal rotting.

Methodology

It can be stored by applying the mixture formed by mixing lime, *rasayanik* (refer to technology no. 9) and then shade drying for 4-5 days, which are then filled in aerated plastic bags and hanged properly.

Practical Utility

By this seed storage technology farmers stored their potato seeds by providing effective check against storage pest and fungal rotting for next season. Before 4-5 days of seed sowing, the seeds were sprayed regularly with *Amrit pani* (refer to technology no. 10) and thereafter, a fast and healthy growth of sprouts were observed.

Potato Seed Storage Technique

CHAPTER XII

LIGHT TRAP FOR INSECT PESTS MANAGEMENT

Introduction

Farmers of the district encounter low production of agricultural crops due to severe infestation of insect pest. For controlling these pests many of them indiscriminately use various chemical pesticides. However, these chemical pesticides have hazardous effect both on health as well as environment. Therefore, switching to eco-friendly method of pest management is the need of hour. As all of us know that light acts as an attractant for various adult insects at night, hence, a light trap can be a good component of eco-friendly insect management.

Methodology

The components of light trap are, a tray made up of tin, one electric bulb and burnt oil/mobil. The tray with burnt oil/mobil is placed near the crop field above the ground level with the help of a bamboo stand and then the electric bulb is placed above (0.5 to 1 feet) the tray. The adult insects get attracted to the light at night and fell down on the tray and get trapped in the burned oil/ mobil.

Practical Utility

- Eco-friendly insect pest management technique
- Low cost
- Less labour intensive

Light Trap for Insect Pests

CHAPTER XIII

TIKKI– ECO–FRIENDLY MOSQUITO REPELLENT

Introduction

Use of chemical mosquito repellents leads atmospheric hazards and thus causes ill effect on human health. Hence, there is a need of eco-friendly management practices to reduce ill effect on environment as well as human health. *Tikki* is an eco-friendly mosquito repellent. These are basically small sized charcoal cake which is burnt and the smoke coming out of it acts as mosquito repellent.

Methodology

Charcoal obtained from the household kitchen is pounded finely with the leaves of *Chinese hibiscus* (Botanical name: Hibiscus rosa-sinesis, Family: Malvaceae). The thick mixture formed is further mixed properly manually and then small flat cakes are made and spread over paper and sun dried properly. It should be dried till the cakes come out of the paper without sticking to it. This *tikkis* when burnt act as mosquito repellent.

Practical Utility

- Eco-friendly mosquito repellent
- Low cost
- Provides enterprise to rural women

Farmer dying the tikkis

Dried tikkis

CHAPTER XIV

INNOVATIVE HAND CART

Introduction

Transportation of the produce to the local market for the farmers of the districts staying in hilly areas is very difficult due to sloppy roads. Therefore, a farmer has developed an innovative hand pulling cart with special brake system which has reduced the drudgery of the person pulling the cart in slopes to a great extent.

Methodology

The cart is made of locally available materials like bamboos and wood. The designed brake system consists of a wood piece whose size is 4-5 cm greater than that of the distance between the two wheels of the cart and is tied with rope in parallel to the shaft of the cart from the front side of wheels of the cart and the other side of the rope is tied with the handle of the cart. By pulling the rope tied at the handle of cart, brakes can be applied to cart.

Practical Utility

- This cart has a carrying capacity of 1-1.5 quintals of load at hilly region
- It reduces the drudgery of the cart puller to a great extent

Innovative Hand Cart

CHAPTER XV

HUPHI– FISH TRAPPING STRUCTURE

Introduction

It is a trap for harvesting fish in between paddy fields. The traps are placed between the bunds by placing the trap along the direction of water current. This trap is mainly used for trapping medium sized fish.

Methodology

The trap is made of locally available bamboo which is split in such a manner that medium size fish are allowed to enter inside it but they can't find way out due to water current. This trap is locally known as *huphi*.

Practical Utility

- Eco-friendly fish harvesting trap
- Very low cost
- Can be used for trapping medium sized fish

Huphi for trapping fish

CHAPTER XVI

DORI– FISH TRAPPING STRUCTURE

Introduction

It is a trap for harvesting fish in canals and rivers. The traps are placed in between by forming bunds. The gate of the structure is placed along the direction of water current. This trap is mainly used for trapping small as well as medium sized fish.

Methodology

The trap is made of locally available bamboo. The gate of the structure is wide in front and narrows down inside. The gate is designed in such a manner that small as well as medium size fish are allowed to enter inside it but they can't find way out due to water current. This trap is locally known as *dori*

Practical Utility

- Eco-friendly fish harvesting trap
- Very low cost
- Can be used for trapping small as well as medium sized fish

Dori for trapping fish

CHAPTER XVII

SEPA– FISH TRAPPING STRUCTURE

Introduction

It is a trap for harvesting fish in canals and rivers. The traps are placed in between by forming bunds. The gate of the structure is placed along the direction of water current. This trap is mainly used for trapping small as well as medium sized fish.

Methodology

The trap is made of locally available bamboo. The gate of the structure is designed in such a manner that small as well as medium size fish are allowed to enter inside it but they can't find way out due to water current. This trap is locally known as *sepa*.

Practical Utility

- Eco-friendly fish harvesting trap
- Very low cost
- Can be used for trapping small as well as medium sized fish

Sepa for trapping fish