



PINEAPPLE RESEARCH STATION, VAZHAKULAM

VISION 2050



Context

The Pineapple Research Station of Kerala Agricultural University at Vazhakulam had a humble beginning on 2nd January 1995 as “Pineapple Research Station & Pest and Diseases Surveillance Unit” under Kerala Horticulture Development Programme (KHDP). Further on 1st July 1997 the centre was delinked from KHDP and became a research station under Kerala Agricultural University.

The station has taken up research and development of pineapple and passion fruit utilizing the field, plant biotechnology, phytochemistry and plant pathology labs working at the station. They are highlighted below

- ◆ Scientific technology for commercial cultivation of Kew and Vazhakulam Pineapple
- ◆ Pure cropping and Intercropping in rubber and coconut and in reclaimed paddy fields
- ◆ Introduced MD-2 pineapple having more shelf life and less core browning for export
- ◆ Identified the presence of Pineapple Mealybug Wilt Associated (PMWA) virus
- ◆ Identified 134P passion fruit variety with better yield, quality and disease tolerance
- ◆ Quality analysis of pineapple and passion fruit
- ◆ Management of disease and pests of pineapple and passion fruit
- ◆ Tissue culture protocols for different varieties of pineapple and banana
- ◆ Sold out lakhs of pineapple and banana tissue culture plants
- ◆ Active presence in digital world with its own website
- ◆ Right vision of ‘Quality People, Infrastructure & work culture for Quality Technology, Products & Services’

Challenges

- ◆ A permanent farm of its own for research and development
- ◆ Adequate quality staff, infrastructure & work culture for technology, products & services
- ◆ A full fledged food technology lab with FPO registration is yet to be realized
- ◆ A separate sales counter is also a need for proper movement of sales subjects
- ◆ Office, Lab and field facilities for full-fledged research and development environment
- ◆ Research funding in pace with the needs
- ◆ Excellent working environment with satisfied minds
- ◆ Tropical Fruit Crops Research Institute (TFCRI) & advanced research centre of excellence with autonomy is still a dream

Operating Environment

Mandate

- ◆ Give research and development support to the pineapple and passion fruit growers
- ◆ Provide quality technology, products and services to the pineapple sector
- ◆ Undertake basic and applied research in pineapple and other fruit crops of Kerala

Facilities

- ◆ Two permanent employees and few contract staff
- ◆ Plant Biotechnology, Phytochemistry, Plant Pathology and Food Technology Labs strengthened with almost all the relevant equipment
- ◆ Leased land for field experimentation
- ◆ Specialized books and periodicals
- ◆ Training hall with projector system
- ◆ Sales centre for sale of tissue culture plants, rooted cuttings and seedlings of passion fruit, banana and pineapple
- ◆ Student projects for both UG and PG students of other universities
- ◆ Right vision of 'Quality People, Infrastructure & work culture'

Opportunities

- ◆ Crop diversification from pineapple, passion fruit and banana to other relevant tropical fruit crops like jack fruit, mango, papaya, rambutan and mangosteen
- ◆ Geographic Indication of Vazhakulam pineapple
- ◆ Kerala Pineapple Mission exclusively for pineapple development in Kerala
- ◆ Farmers are familiar with the scientific cultivation practices
- ◆ Advent of large scale commercial farming and agribusiness in pineapple
- ◆ Facilitating agencies in pineapple sector– financial, input and other
- ◆ Well established farmers and merchants associations for pineapple
- ◆ Wide acceptance of pineapple as intercrop in rubber and coconut plantations
- ◆ Favourable bank and government policies
- ◆ Technical know-how through research stations already available
- ◆ Active presence and involvement of SHGs like Kudumbasree



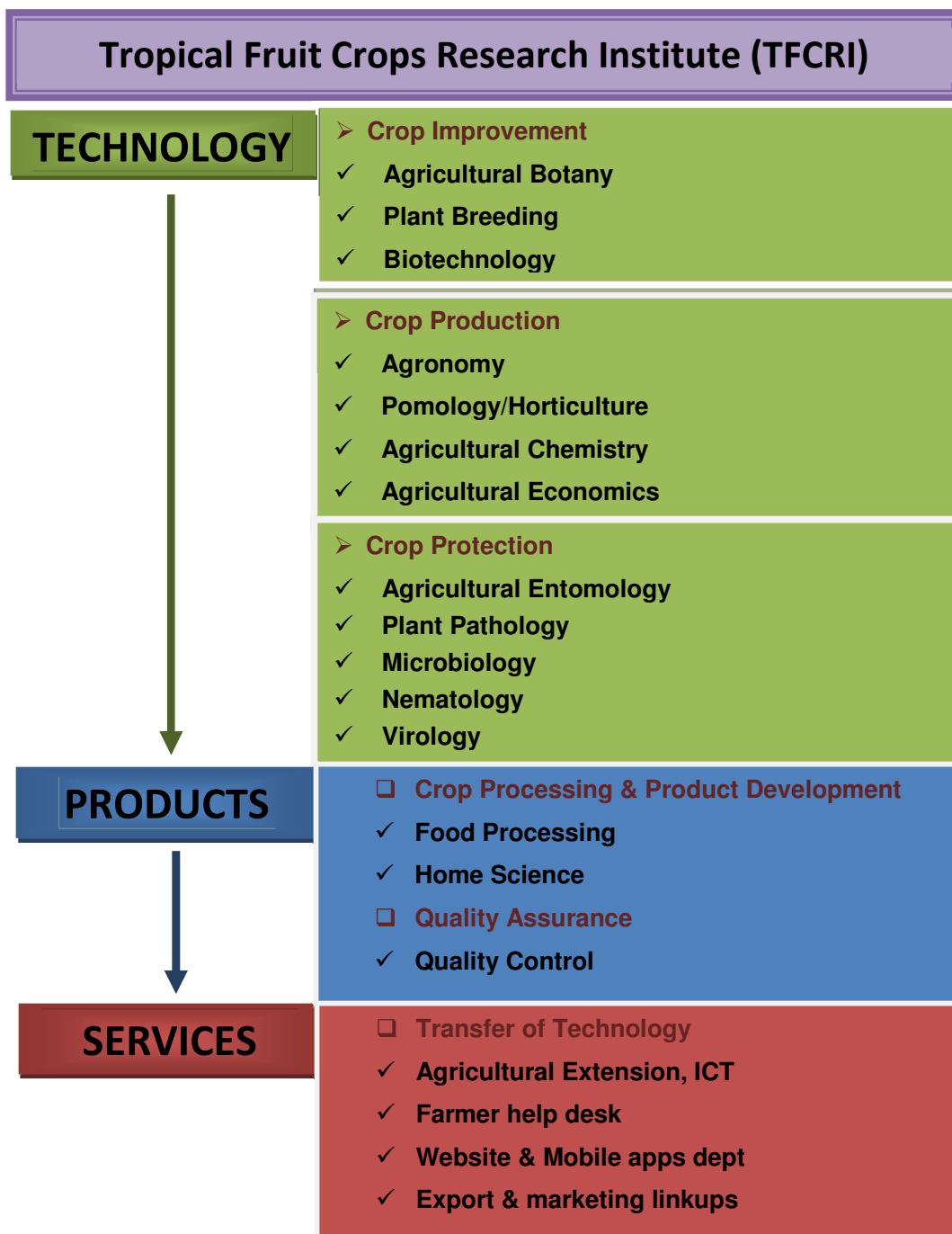
Goals/Targets

Goal	Strategy
Mechanization of cultivation practices	Use of machines for land preparation, planting, weeding, plant protection, fertilizer application and harvesting reducing the labour expenses and dependence
Production of virus and disease resistant plants	Through molecular modeling of crops Development of new pineapple varieties resistant to PMWA virus and fungi
Economic optimization of production technology	Ways and means for maintaining maximum production and profit in cultivation
Promoting pineapple cultivation	through a network of field demonstration units owned by farmers set by research centers
Organic farming	Put forward practices for enhancing organic farming for pineapple curtailing the use of chemicals causing environmental pollution
Boosting processing, product diversification and export	Learn the setbacks faced by processors and exporters and undertake studies to resolve them
Ensure product diversification and full utilization throughout the value chain	Develop economically viable and sustainable technology for pineapple fruit products, fibre, bromelain, vine, bio gas, bio fuel, compost, etc
FPO registered food technology lab	Establish full fledged food technology lab for production of new and refined products from pineapple and related fruit crops
Quality control lab	Assessing the quality of fruits and products available for export and suggesting the maintenance protocols for quality assurance
Internet and mobile technology	Ready availability of novel technologies to the farmers Availability of all the latest technologies in pineapple cultivation through internet Farmer queries and all technical support accessible through the latest mobile technology by putting up an application in the name of the research station, making a novel technology for marketing and export
Outsourcing	Making available even the high cost latest technologies in any part of the world
Professional management, coordination, monitoring and control system	Linkage between all the research centres, industries, associations in both private and public sectors for a combined R & D efforts and exchange of technologies
Precise, fast and sophisticated work environment with autonomy	Best human resource, Infrastructure, equipment, automation, work culture & self sustenance



Way Forward

Pineapple Research Station, Vazhakulam visualizes to be Tropical Fruit Crops Research Station (TFCRS) in the future. This advanced research centre of excellence dreams to be the ultimate authority and provider of excellent quality technology, products and services in tropical fruit crops through concerted research and development efforts sustained by best human resource and infrastructure development in line with Our Motto ‘Quality People, Infrastructure & Work culture for Quality Technology, Products & Services and Merit alone counts for Quality suitable for the purpose’.



Invest, Innovate and Inspire for Growth





PINEAPPLE



Context

Kerala has exclusive advantage in producing Mauritius variety of queen group, the GI registered Vazhakulam pineapple, which is highly suitable for export market. The pineapple growers to a large extent are now adopting the modern cultivation practices like optimum planting density, hormone application for uniform flowering and other scientific management practices. The pineapple fruits are consumed as fresh fruit or made into products like jam, squash, candy etc., for value addition. The variety proposed for cultivation is Mauritius since huge internal market as well as export potential is available. Its advantages include longer shelf life, sweetness and can be consumed as fresh fruits. Sea shipment protocol for export of pineapple has been developed.

Vazhakulam pineapple

Pineapple has been commercially grown in Vazhakulam area for more than 50 years for its excellent fruit for fresh consumption. Vazhakulam area is ideally suited for the production of pineapple for table purpose. Planting is done in almost all the months, except during the heavy monsoon days. Hence, fruits are available round the year. Vazhakulam is considered as the biggest pineapple market in India from where the fruit is being transported to all the South Indian states and most of the North Indian states. It is grown in the districts of Ernakulam, Kottayam, Pathanamthitta and the low elevation areas of Idukki district in Kerala. It is the centre of pineapple trade in Kerala and India. Vazhakulam pineapple was registered as Geographical Indication (GI) No. 130 under Agricultural-Horticultural product at the GI Registry, Chennai on 4th September 2009.

Challenges

- ◆ Expanding area under cultivation and increasing productivity
- ◆ Identification of specific varieties for fresh fruit, canning and juice segments suitable for cultivation ensuring sustained economic return
- ◆ Introduction of disease resistant varieties
- ◆ Mechanization of cultivation practices
- ◆ Provision of improved technology and production inputs including credit
- ◆ Economic optimization of production technology
- ◆ Organic pineapple farming
- ◆ Meeting the export quality requirements and long transportation
- ◆ Post-harvest management, processing, value addition and product diversification
- ◆ Development of small, medium and large processing industries
- ◆ Boosting processing, product diversification and export
- ◆ Ensuring full utilization throughout the value chain
- ◆ Storage and marketing support ensuring quality
- ◆ Advanced specific training support to the stakeholders



- ◆ Exploration of new fields for high-density planting, tissue culture, organic farming, vermi-composting, etc.
- ◆ Staggering of pineapple production through chemical induction and round the year production, peak synchronizing with summer season highest demand
- ◆ Labour resource mobilization especially through NREGS to promote agriculture and food security in rural areas
- ◆ Issues of mosquito-borne infectious diseases as Leptospirosis, Malaria, Dengue, Chikungunya, etc
- ◆ Price, market and climate uncertainties causing farmers' suicides
- ◆ Spread of false rumours about pineapple cultivation and local issues
- ◆ Risk of ecological/environmental degradation
- ◆ Need of bio- waste management
- ◆ Women empowerment through Kudumbasrees, SHGs, etc

Operating Environment

The following technologies are available

- ◆ Situation specific recommendation for management of pineapple
- ◆ Technology for cultivation of pineapple as pure crop and as intercrop in coconut, rubber and cashew is available. Recommendations under different soil and climatic conditions like reclaimed low lands, nutrient management etc are available.
- ◆ Quality analysis of fruit for marketing and export
- ◆ Identification of diseases and pests of pineapple, especially PMWA Virus by ELISA test
- ◆ Protocol for tissue culture propagation of pineapple
- ◆ Training on scientific pineapple cultivation

Opportunities

The state offers great opportunities for expanding the cultivation of pineapple. Important among them are listed below.

- ◆ Vazhakulam has traditional pineapple growers even before four decades ago
- ◆ Kerala Pineapple Mission started in 2012 exclusively for pineapple development
- ◆ Well organized Pineapple Farmers' Association and Merchants' Association
- ◆ Research and development support from Kerala Agricultural University through Pineapple Research Station, Vazhakulam and Pineapple Research Centre, Vellanikkara
- ◆ Industry support especially from Vazhakulam Agro and Fruit Processing Company Ltd.
- ◆ Markets at Vazhakulam and nearby areas and VFPC markets in all districts
- ◆ GI registration of Vazhakulam pineapple has boosted the export from the state
- ◆ Farmers have locally available planting material at cheap rates
- ◆ Farmers have knowledge of pineapple cultivation
- ◆ Farmers are increasingly following commercial cultivation
- ◆ The traders in the market are generally vibrant and relatively organized
- ◆ Farmers and promoters are interested in pursuing sustainable agriculture, which reduces costs and increases farmers skills to manage food security concerns
- ◆ The opportunity for niche organic market exists
- ◆ The production within all the potential areas can be increased
- ◆ Support of government & credit agencies, SHGs, Kudumbasrees, NREGS, etc



Goals/Targets

<i>Goal</i>	<i>Strategy</i>
Mechanization of field farming in the processes like weeding, mulching, drenching, fertilizer application and harvest	Development and introduction of new machines
Identification of new varieties suitable for fresh fruit, canning and tolerant to stress, diseases	Variety evaluation in field for the purpose
Mass production of outstanding varieties	Introduction of new promising varieties from different places and multiplication
Economical tissue culture production	Cheaper methods for production
Effective introduction of organic farming, inter and multiple cropping systems	Following organic practices and introducing profitable crops in pineapple farming
Rooftop cultivation of pineapple	Making pineapple a component of food security and promoting rooftop agriculture
Reduction of post-harvest losses	New techniques for extending shelf life
Commercialization of fibre extraction	Protocol for extraction and commercial production of fibre for textile industries
Extraction of bromelain enzyme and its commercialization	Protocol for extraction and commercial production of bromelain for pharmaceutical and cosmetic industries
Waste utilization as biogas, biofuel and fodder	Introducing new industries for commercialization
Effective tackling of bio-waste management problems	Utilization of fruit waste for different purpose
Alleviation of climate and market uncertainties	Climate forecasting and market intelligence
Pineapple web portal	Provided with all technical help in cultivation

Way Forward

The important tasks before us are the following

- ◆ Sustaining past achievements and moving ahead with more tempo
- ◆ Resource mobilization, especially labour and inputs
- ◆ Market strengthening and support price fixation and creating storage facilities
- ◆ Extending loan facilities for cultivation on leased lands
- ◆ Strengthening existing processing units and starting new ones
- ◆ Export of frozen and dry fruits
- ◆ Utilization of entire plant parts of pineapple
- ◆ Applications in textile, pharmaceutical and cosmetic industries
- ◆ Improved research- farmer-market-export links
- ◆ Control of emerging infections and lifestyle diseases
- ◆ Affordable, accessible and quality health care to all





Context

India, for many years, has enjoyed a moderate harvest of purple passion fruit in the Nilgiris in the South and in various parts of northern India. The yellow form was unknown in India until just a few decades ago when it was introduced from Sri Lanka and proved well adapted to low elevations around Madras and Kerala. It was quickly approved as having a more pronounced flavor than the purple and producing within a year of planting heavier and more regular crops. Its increasing demand during the emergence of contagious fevers raised its popularity.

Challenges

- ◆ Availability of land exclusively for passion fruit farming
- ◆ Expanding area under cultivation and increasing productivity
- ◆ Seasonality of flowering and fruiting
- ◆ Making constituent of any cropping system
- ◆ Introduction of stress and disease tolerant varieties
- ◆ Loss of plants due to wilt diseases
- ◆ High disease susceptibility in water logged conditions
- ◆ Need of organic manure for best yield
- ◆ High costs of trellis preparation
- ◆ Provision of improved technology and production inputs including finance
- ◆ Economic optimization of production technology
- ◆ Commercialization of cultivation
- ◆ Rooftop and homestead cultivation
- ◆ Organic production technology
- ◆ Overcoming pollination and fruit setting problems
- ◆ Marketing problems and post-harvest losses
- ◆ Post-harvest management, processing, value addition and product diversification
- ◆ Development of small, medium and large processing industries
- ◆ Commercial processing and industrialization
- ◆ Boosting processing, product diversification and export
- ◆ Ensuring full utilization throughout the value chain
- ◆ Extending shelf life of fruits and fruit products
- ◆ Low rate of export

Operating Environment

- ◆ Evaluation of different passion fruit types in south India resulted in a promising variety with better yield and disease tolerance
- ◆ Popularization of the new variety 134P and its production technology
- ◆ Popularization of medicinal uses of the passion fruit



- ◆ Production and sale of seedlings and rooted cuttings of 134P passion fruit variety
- ◆ Sale of leftover fruits after lab analysis
- ◆ Identification and control of wilt disease
- ◆ Training on production and processing of passion fruits

Opportunities

- ◆ Antimicrobial and antioxidant properties of passion fruit for curing several new generation fevers and diseases like cancer
- ◆ Immune promoting, disease curing and other medicinal properties
- ◆ Exceeding local demand for passion fruit
- ◆ Agroclimatic situation in Kerala is better suited for passion fruit cultivation
- ◆ Yellow and purple varieties grow well even in the households
- ◆ Single plant could yield more than 10 kg of fruits during the season
- ◆ Plant life span is over 5 years
- ◆ Pruning after harvest could generate new flushes for better yield in the succeeding year
- ◆ Easy to consume and relished by all
- ◆ Appealing thick colour, aroma and flavour of fruit juices
- ◆ Highly refreshing fruit with more than 30% juice productivity
- ◆ Easily blends with other fruit juices
- ◆ Synergy with apiculture and floriculture

Goals/Targets

Goal	Strategy
Mass production of selected variety 134P	Tissue culture protocol standardization
Evolving the best vegetative propagation method for getting true to type	Study of vegetative propagation methods
Development of agronomic practices for improving juice production	Studying the factors influencing juice production
Effective methods of storage for extending shelf life	Applying new techniques for improving shelf life
Standardization of improved processing and preservation methods for passion fruit juice	Passion fruit juice preservation methods to cope the demands during lean season
Antioxidant and antimicrobial screening of passion fruit types against prevailing antibiotics	Study in different passion fruit types resulting in the best ones
Studying floral and fruit morphology and physiology for effective breeding	Floral structures like stigma and anther position and maturation; flowering time and duration; all play a crucial role in fertilization
Breeding for improved yield, quality and disease and stress resistance	Varietal introduction, hybridization and evaluation
Selection of woody virus resistant and phytophthora and fusarium wilt resistant varieties	Application of molecular techniques and field trials



Effective transport technology for boosting cultivation, production, processing, industrial utilization and marketing passion fruit in the state	New techniques to be introduced for managing post-harvest losses making it available throughout the year
Small, medium and large industries for juice processing and product diversification	Syrup, squash, wine, jam etc., are some recipes useful for small scale industries
Fruit waste utilization	More than 60% of the fruit portion is waste, leaving an immediate requirement in waste utilization
Profit maximization by full utilisation	Promotion of apiculture and floriculture. Extraction of dyes from rind and oil from seed involving SHGs, women and youths
Market price fixation and market mobilization	Marketing facilities with effective linkages
Web portal for passion fruit	Providing all the information regarding the fruit production, processing and marketing

Way Forward

Passion fruit juice has nutritional and health benefits due to the presence of more antioxidants and its antimicrobial activity. Moreover, the agroclimatic situation in Kerala is better suited for passion fruit cultivation. Passion fruit juice blends easily with most of the fruit juices and is more acceptable to the consumers. Hence, there is great scope for the popularization, production, processing and marketing of passion fruit in the state. The focus areas are the following.

- ◆ Development of varieties for both plains and high range zones
- ◆ Efficient low cost trellis preparation
- ◆ Effective pollination aids
- ◆ Organic farming practices
- ◆ Standardization of fertigation and precision farming
- ◆ Techniques for rooftop and homestead cultivation
- ◆ Disease and stress resistant varieties
- ◆ Efficient vegetative propagation methods
- ◆ Mechanization in cultivation practices
- ◆ Processing and value addition
- ◆ By-product utilization and waste management
- ◆ Promotion of apiculture and floriculture.
- ◆ Extraction of dyes from rind and oil from seed involving
- ◆ Active involvement of public & private input & credit agencies, SHGs, women and youths
- ◆ Digital automated Help desk for all involved and all concerned



Mauritius MD-2 Amrutha Kew



134P

