



KERALA AGRICULTURAL UNIVERSITY

VELLANIKKARA, TRICHUR

**RESEARCH HIGHLIGHTS
(1985-89)**



**MEETING OF THE ICAR REGIONAL COMMITTEE
VIII TO BE HELD AT PONDICHERY
DURING AUGUST, 1989**

807053

NEW CROP VARIETIES

RICE

SWARNAPRABHA

This is a white kelled variety produced by crossing Bhavani with Triveni. Duration is 100-105 days. Yield is 4.5-5.0 t/ha. Released from the Regional Agricultural Research Station, Pattambi. Can be grown during all the three crop seasons.

RESHMI

A mutant from Orpandy by gamma radiation. Duration is 150 to 180 days. Plant is tall and well suited to ill-drained deep areas and saline areas. Suitable for second crop season only. Yield is 4 t/ha. Resistant to BPH and moderately resistant to gall midge and stem borer. Evolved at the Regional Agricultural Research Station, Pattambi.

SUARNAMODAN

It is a selection from ARC-11775. Duration is 115-120 days. Plant type is semi-tall. Average yield 2.6 t/ha. Grain is long bold. Suited to the upland modan cultivation. Kernel is white. Developed at the Regional Agricultural Research Station, Pattambi.

PAVIZHOM

This was evolved at the Rice Research Station, Moncompu by crossing IR-8 with Karivennel. Duration is 115 to 118 days. Average yield is 4.9 to 5.5 t/ha. Grain is medium bold and kernel is red. This is fairly resistant to BPH and moderately resistant to stack burn. Suitable for both the seasons of Kuttanad.

KARTHIKA

From the cross Triveni x IR-1539, this selection was isolated which has a duration of 110 to 115 days. Average yield is 5 to 5.5 t/ha. Grain is medium bold and kernel is red. Suitable for all the three seasons. Tolerant to BPH. Evolved at the Rice Research Station, Moncompu.

ONAM

This was evolved at the Rice Research Station, Kayamkulam from a cross between Culture-16 and Triveni. It is an early maturing photoin-sensitive variety with 95 days duration. Grain is bold and kernel is red. Moderately resistant to BPH and sheath blight. Average yield is 4 t/ha. It is drought resistant and suited to the first crop season in Onattukara tracts of the Special Zone of problem areas.



BHAGYA

This is a progeny evolved at the Rice Research Station, Kayamkulam from the cross Thadukkan x Jaya. Duration is 95 to 100 days. It is a photoinensitive variety with bold and red coloured grains. Moderately tolerant to sheath blight, leaf roller and rice case worm. Average yield is 4.3 t/ha. It is specifically suited to the first crop season in Onattukara.

LEKSHMI

From the cross between Kottarakkara-1 x Poduvu, this variety has been isolated. It is a photosensitive variety with 165 days duration. The grain is bold and kernel is red. It is tolerant to stem borer, leaf roller and sheath blight. Average yield is 4.0 t/ha. Suited to second crop season. This was also evolved by the Rice Research Station, Kayamkulam.

VYTTILA-3

This is a cross between Vyttila-1 (Pokkali) and T (N) 1. It gives 20 per cent more yield than Vyttila-1. Duration is 115 days. Kernel is red. Average yield is 3100 kg/ha. Evolved at the Rice Research Station, Vyttila.

PROMISING CULTURES

CULTURE-153-1

This is a cross between IR-1516 x PTB-33 which is semi-tall and moderately tolerant to BPH. Average yield is 5.5 t/ha and the duration is 120 to 125 days. Developed at the Rice Research Station, Moncompu.

CULTURE-170

This is a cross between ARC-6650 and Jaya developed at Rice Research Station, Moncompu. Duration is 100-110 days. Grain is medium slender. Moderately resistant to BPH.

RED TRIVENI CULTURE

Triveni variety of rice released from the Regional Agricultural Research Station, Pattambi has good reputation all over the country as a short duration variety possessing tolerance to BPH. A red riced selection was made from the Triveni variety. This culture possesses all the desirable attributes of the white kernelled Triveni. The red Triveni has already become popular in Kerala due to its red riced quality. Yields up to 7 t/ha have been obtained in farmers' fields.

CULTURE-871

This is a season-bound culture developed by hybridization between Co-25 x (Triveni x Vellathilkolappala) at the Rice Research Station, Pattambi. Kernel is red. Yield is 5-6 t/ha. Suited to the Mundakan (Rabi) season only. Highly suitable for areas where Co-25 is cultivated.

CULTURE-24-20

A very early duration rice Culture-24-20 has been obtained from a cross between T-140 and IR-8. This has a duration of 75 to 85 days during the summer season and gives comparable yields with other short duration varieties of about 90-100 days. It has bold grains and red kernels. In the adaptive trials conducted in the Kole areas, in Trichur district, this culture recorded a mean grain yield of 3075 kg/ha. Culture-24-20 is suited to situations where an extra short duration variety is required.

CULTURE-1358-2-1, 1423-5 and 1336-3

During the second crop season, cultivators in Onattukara region prefer to grow a photosensitive rice variety. Hybridization works taken up followed by comparative evaluation have yielded three promising cultures viz., 1358-2-1 (Jaya x PTB-4), 1423-5 (PTB-4 x TR-17) and 11336-3 (Jaya x PTB-20). All these are photosensitive cultures and the average yield is 5 t/ha. They possess good straw yield. These cultures have been developed at the Rice Research Station, Kayamkulam.

CULTURE-23332-2

This is a gamma induced mutant from MN-54-42 with an yield of 4-5 t/ha. Duration is 130-135 days. This culture has been developed at the Regional Agricultural Research Station, Pattambi. This is a suitable variety for the Northern Zone of Kerala.

EDAVALA SELECTION

This is a pure line selection from the local variety 'Edavala' cultivated in the Wynad district. It is suitable for the second crop season in High Ranges with more than 20 per cent increase in yield over the local variety. Duration is 140-150 days. Developed at the Regional Agricultural Research Station, Ambalavayal.

CULTURE-1727

This culture developed at the Rice Research Station, Pattambi has outyielded the most important IRRRI variety IR-36 by 0.5 t/ha. in 43 locations tried in 18 countries during 1984-85. This is a gamma induced mutant from MN 54-42. Duration is 130-135 days. Suitable for Northern Zone of Kerala.

COCONUT

LAKSHAGANGA

A hybrid between Lakshadweep Ordinary x Gangabondam developed at the Regional Agricultural Research Station, Pilicode. The average yield is 122 nuts year/palm under rainfed conditions with a mean copra content of 195 g/nut. This has been recommended for cultivation throughout the country in the All India Co-ordinated workshop.

ANANDAGANGA

This hybrid coconut variety has been evolved by crossing Andaman Ordinary x Gangabondam at the Regional Agricultural Research Station, Pilicode. Average yield is 95 nuts/palm/ year under rainfed conditions, and the mean copra content is 276 g/nut. Suitable for large scale commercial cultivation in all Zones in Kerala

KERAGANGA

This was developed at the Regional Agricultural Research Station, Pilicode from the cross between West Coast Tall (WCT) x Gangabondam. Average yield is 102 nuts year under rainfed conditions, and the mean copra content is 230 g/nut. Suitable variety for cultivation in all the zones of the State.

PROMISING HYBRIDS

In addition to the above coconut hybrids three more coconut hybrids namely WCT x MDY (Malayan Dwarf Yellow), WCT x CDG (Chawghat Dwarf Green) and WCT x CDO (Chawghat Dwarf Orange) were also found superior. These promising hybrids are under multi-locational trials in five different research stations of Kerala Agricultural University. The hybrid WCT x CDG has performed better than its parents at the Nilaswar and Pilicode stations. The average yield is above 100 nuts palm.

SESAMUM

THILOTHAMA

This high yielding multi-poded variety of sesamum was released from the Rice Research Station, Kayamkulam. This variety is suitable for cultivation in Onattukara. It has an average seed yield of 500 kg/ha. It is a cross between PT-5835 x Kayamkulam-1. Oil content is 55 percent.

SOMA

A pure line selection from a Punjab type. Better yielder in summer rice fallows. Duration is 100 days. Yield is 500 kg/ha. Developed at the College of Agriculture, Vellayani.

SURIYA

This variety has been developed at the College of Agriculture, Vellayani by pure line selection from a West Bengal type. Suited to upland conditions. Average yield is 500 kg/ha.

VEGETABLES

SAKTHI—A BACTERIAL WILT RESISTANT TOMATO

Sakthi, a bacterial wilt resistant tomato variety is developed from the line LE-79 through single seed descent method of selection. The new variety is resistant to 3 isolates, K-60, 126408-1 and Tifton 80-1, of *Pseudomonas solanacearum* and can be cultivated throughout Kerala and in areas which are highly prone to the incidence of bacterial wilt. The variety is having round fruits of 50-60 g fruit and yields 32 t ha.

SURYA – A BACTERIAL WILT RESISTANT BRINJAL

Bacterial wilt is a serious problem for cultivation of Solanaceous vegetable in Kerala. The Department of Olericulture, College of Horticulture, Vellanikkara has developed a bacterial wilt resistant variety 'Surya' by single plant selection from a segregating population of SM-6. Surya is a spreading non-pickly variety with purple oval fruits. The yield plant ranges from 0.7 to 1.31 kg with an average fruit weight of 50 g.

JWALAMUKHI AND JWALASAKHI –TWO PROMISING CHILLI VARIETIES

'Jwalamukhi' and 'Jwalasakhi' are two chilli varieties with high yield potential. They are ideal for culinary purposes and can be grown either as a pure crop or included in the homestead farming system. Further, the two varieties are amenable to high density planting and ratooning. Average yield is 20-23 tonnes ha.

CM 14—A HIGH YIELDING PUMPKIN LINE

CM-14, a pumpkin line developed in the Department of Olericulture, College of Horticulture, Vellanikkara has been identified for national release by the IX Workshop of All India Co-ordinated Vegetable Improvement Project.

TA 19—A HIGH YIELDING SNAKEGOURD LINE

TA-19, a high yielding snakegourd is being developed at the College of Horticulture, Vellanikkara by selection.

VK - 1 PRIYA—A HIGH YIELDING BITTERGOURD VARIETY

VK - 1 Priya is a high yielding bittergourd variety and is highly accepted by farmers. This has long fruits which are green with white tips.

MUDICODE LOCAL — A HIGH YIELDING ORIENTAL PICKLING MELON VARIETY

'Mudicode Local' is a high yielding line in oriental pickling melon developed at Kerala Agricultural University. This variety is characterised by long oval fruits measuring a length of 28.3 cm and weighing about 1.48 kg/fruit.

PROMISING BANANAS FOR VEGETABLE PURPOSE

A good collection of banana genetic resources are being maintained and evaluated at the Banana Research Station, Kannara. Of the eighteen varieties recommended for commercial cultivation in the State, Monthan, Batheesa, Kanchikela and Nendrapadathy - all belonging to ABB genome, are typical culinary types.

DRIP IRRIGATION IN ASHGOURD

Ashgourd requires irrigation at IW/CPE ratio of 0.17 for better yield during summer months. The effects of methods of irrigation viz. drip and basin on fruit yield were not significant. Significant increase in fruit yield was recorded when the plots were mulched with paddy straw. Drip system of irrigation produced more number of fruits/plant whereas the fruit weight was more in the basin system of irrigation.

NUTRITION GARDEN

Fruits and vegetables have to be given a prominent place in our diet as they supply the daily requirements of essential nutrients like proteins, minerals, vitamins etc. There should be a nutrition garden in every homestead for providing the requisite quantity and kind of fresh fruits and vegetables. A nutrition garden of 100 m² area is sufficient for a family of 5 numbers. Crop rotations for vegetables are followed such that at least 4-6 kinds of vegetables are always available. The same area can be used in all three seasons in a year. For intensifying crop production, vegetables can be raised in the interspaces of perennials, on border of annual plots and on the fence.

PEPPER

The following promising cultures are under advanced stages of release from the Pepper Research Station, Panniyur.

CULTURE 239

This is a selection from the open pollinated progenies of Perumkod with an average yield of 6 kg green pepper per vine with steady bearing character.

CULTURE 331

It is evolved by crossing Uthiramkotta with Cheriyaakaniyakadan. The spikes are long, berries are bold and yield is 6 kg green pepper per vine.

CULTURE 141

It is a cross between Balankotta and Uthiramkotta. Number of spikes per unit area is high and average yield is about 6 kg green pepper per vine.

PURE LINE SELECTION IN KUTHIRAVALI

The culture obtained as a result of pure line selection from Kuthiravali recorded higher yield than Kuthiravali local even under adverse situations of weather. It is a stable variety. All the above cultures are under advanced stages of trials.

CASHEW

ANAKKAYAM-1

The high yielding type BLA-139-1 which possesses special features like early flowering, short flowering and harvest phases has been released as a superior variety under the name Anakkayam-1. The average yield is 14 kg nut/tree/year.

PROMISING HYBRIDS AND SELECTIONS

Seven hybrids have been identified as promising with regards to yield, nut size, shelling percentage and kernel grade. The yield ranges from 15.56 to 29 kg/tree and nut size from 5.80 to 10.85 g. The shelling percentage ranges from 23.08 to 40.28. The hybrids 856, 1591, 1596 and 1602 have kernel grade W. 180 and the cultures 1597, 1608 and 1593 have kernel grade W. 210.

PULSES

COWPEA

Two high yielding lines (Culture-9 and 7) with better grain quality than the popular *Krishnamoni* released by KAU earlier have been isolated at the Rice Research Station, Pattambi. These cultures flower within 35 to 40 days. The average yield is 1120 kg/ha for culture 7 and 1371 kg/ha for culture 9.

AROMATIC & MEDICINAL PLANTS

There are at present more than 200 different medicinal and aromatic plant species maintained at Main campus of Kerala Agricultural University at Vellanikkara.

A germplasm collection of 477 types of lemongrass is maintained at Aromatic & Medicinal Plants Research Station, Odakkali. The lemongrass species *Cymbopogon flexuosus* is found most suitable for Kerala.

SUGARCANE

Five cultures of sugarcane have been advanced to the Zonal Varietal Trial for the peninsular region. These include CO-TL. 88-116, 88-118, 88-120, 88-321 and 88-322. All these are 10 months duration and give an average yield above 100 t/ha. These cultures are tolerant to flood and red rot disease.

FODDER CROP

HARITHA

This is a mutant from the guinea grass variety FR 600. It is superior to the popular variety 'Mackuen' in fodder yield and is particularly suited for growing in sandy soils under shady situations. Developed at the College of Agriculture, Vellayani.

CROP MANAGEMENT

BIOLOGICAL CONTROL OF *SALVINIA MOLESTA*

The aquatic fern *Salvinia molesta* was the major weed menace in Kerala till 1985. It had spread to above 60,000 hectares of paddy fields and all the lakes and navigation canals in Central Kerala. Navigation through the canals carpetted with thick mat of the weed was a great problem. Paddy cultivation became highly expensive due to the very high cost involved in the removal of the weed mat before starting cultivation. Fishing and collection of lime shell from the lakes were also adversely affected by the presence of the weed. Chemical and mechanical means of control had not brought about the desired suppression.

During 1983, the Brazilian weevil *Cyrtobagous salviniae* was imported from Australia. The insect was first reared in the laboratory and released in the canals and lakes in Central Kerala. Within about 2 months of release symptoms of damage to the weed could be observed. Packets of the weevil infested *Salvinia* were distributed in all weed infested areas during 1984-85. By the end of 1986 most of navigation canals were free from the weed. In the paddy fields also the weed growth has been suppressed and the quantity of weed mass to be removed was considerably less than previous years. From a recent survey conducted, it has been found that the annual savings in expenditure to the rice farmers of Central Kerala especially in Kuttanad region due to suppression of the weed menace is Rs. 68,00,000/-

WEED CONTROL IN RICE

The practice of coating paddy seeds with Calcium peroxide and sowing has been developed at the Rice Research Station, Moncompu for the effective control of wild rice and other weeds in the paddy fields. The treated seeds are sown in the fields and the stagnant water is allowed to remain in the field for about 10 days. During this period the treated paddy seeds germinate and grow utilising the oxygen from calcium peroxide while other seeds including seeds of wild rice do not germinate under such a situation. After about 10 days, water is drained from the field. The early germinated paddy plants will smother the late germinated weeds effectively.

BACTERIAL LEAF BLIGHT CONTROL

At Regional Agricultural Research Station, Pattambi it was found that spraying of fresh cowdung extract (20 g/l) was very effective for the control of bacterial leaf blight of rice.

SHEATH BLIGHT CONTROL

Application of carbistin (500 g/ha) or Hinosan (500 ml/ha) was effective in controlling sheath blight incidence in rice. Two need based applications with any one of the fungicides were sufficient to control the disease. Validacin-3L at the rate of 2 ml/l was also found effective against sheath blight disease.

COMBINED APPLICATION OF CARBOFURAN AND UREA

Joint application of carbofuran at the rate of 0.75 kg ai/ha and urea to supply 10 kg nitrogen/ha, 20 days after planting of paddy increases grain yield and effectively controls paddy pests.

PADDY WINNOWER CUM CLEANER

A paddy winnower-cum-cleaner has been developed at the Mannuthy Centre of the Central Zone. It has an efficiency of cleaning 1000 kg/hour for grain purpose and 600 kg/hour for seed purpose.

CONTROL OF RED PALM WEEVIL IN COCONUT

Red palm weevil, *Rhynchophorus ferrugineus* is a very serious pest of coconut especially of young palms in Kerala. Root application of monocrotophos (75 ml/palm in 75 ml water) resulted in the control of the pest.

CORIED BUG IN COCONUT PALM

The population of the pest, 'coried bug' starts building up from June and reached the maximum during August to October and it declines from November. The percentage of nut infestation was positively correlated with rainfall and humidity and negatively with temperature.

LEAF ROT DISEASE OF OILPALM

A new leaf rot disease caused by *Colletotrichum gleosporioides* has been identified. This is a new record of the disease in India on oil palms.

BEST ROOT STOCKS IN CASHEW

BLA-139-1, BLA-273-1 and BLA-39-4 are the best root stocks for uniform seedlings with higher success.

NEW BACTERIAL CULTURES FOR PULSES

Two efficient *Rhizobium* cultures for blackgram (KAU-BG 2 and BG 12) and one for groundnut (KAU-GN 1) were developed at the College of Agriculture, Vellayani.

PAIRED-ROW PLANTING OF BANANA

Paired-row planting of Nendran banana at a spacing of 3m between two paired rows, one metre between the rows in the paired row and 2 metres between plants in the row was found to be the ideal planting system for accommodating inter crops and for getting maximum return from unit area.

IRRIGATION FOR SESAMUM

Sesamum responded well to irrigation. Surface irrigation at 30 cm depth during the critical stages of 4 to 6 leaf, branching, flowering and pod-formation increases the yield by 40 percent.

FISHERIES

The rotational cropping of rice and fish resulted in the production of 1006 kg/ha of table sized fish in 184 days in addition to rice grain yield of 2127 kg/ha at Kumarakom. The study highlights that fish culture in rice fields after the kharif crop of rice is more profitable than a second crop of rice. The study also showed that by a cyclic conversion of rice fields for fish culture, table sized marketable fishes could be produced even in a short interspace period of 6 months without additional expenditure on feed or fertilizer.

Study on prawn culture in channels surrounded by bunds on which coconuts are grown at Regional Agricultural Research Station, Kumarakom showed an average production of 805 kg/ha of fresh water prawn in 220 days fetching a profit of Rs. 21,000/ha. The fresh water prawn grows to an appreciable size during this period with a recovery of 97 per cent.

Trials on simultaneous farming of rice and fish have been found to be a viable technology for Kuttanad region. A yield of 600 kg/ha of fish was obtained in 220 days when raised along with rice. The yield of fish recorded from this experiment is higher than that recorded elsewhere in India.

In a cropping system trial at Rice Research Station, Vyttila, it was found that selective stocking of prawn after rice crop have better return than the traditional prawn filtration.

Comparatively higher weight of fishes like Catla, Rohu, Mrigal, Common carp and Grass carp was registered in ponds manured with cow-dung + cow urine under the experiment on organic recycling in integrated farming of utilising livestock waste at Regional Agricultural Research Station, Kumarakom.

A well pronounced seasonal influence is noticed in the seed recruitment of commercial species such as *Chanos chanos*, *Mugil cephalus* and *Lates calcarifer*. In respect of *C. chanos*, the season was between February and June with peak in May for *M. cephalus* between June and August with peak in July and for *L. calcarifer* during intense monsoon period.

Polyculture of *C. chanos*, *M. cephalus* and *Liza macrolepis*, keeping definite ratio and optimum stocking revealed that *C. chanos* is the most suitable species for culture purposes.

Relative increase in stocking ratio of *Tilapia mosambika* resulted in higher growth and production of *L. calcarifer* during biculture. Offspring of the former also proved to be a better forage for the latter.

VETERINARY & ANIMAL SCIENCES

Research on cross breeding of local Malabari goats with Exotic breeds (Saanen and Alpine) has shown that Saanen x Malabari crosses at 50% exotic inheritance are better milk yielders than all other crosses and over the native Malabari.

The genetic profile of goats was assessed on the polymorphism of haemoglobin, proteins, enzymes and other substances like serum potassium and Transferrin to assess the possible correlation with production performance. Transferrin reflected great scope for serving as a genetic marker for selection of goats for improved milk production.

A suitable strain of bird adapted to the agro-climatic conditions of Kerala was evolved. It was found that the cross-bred obtained by crossing Australorp male with white leghorn female had the good egg production and livability under low and medium technology farming situations.

Studies were conducted to improve the genetic architecture of white leghorn birds. The strain which was evolved (6th generation cross of IWN x IWP) has been shown (by random testing) as a very superior bird in egg production, feed efficiency, livability and return over feed cost.

Studies were conducted to reassess the floor space requirement for broilers, and the dietary protein requirements and energy needs of poultry under the hot humid conditions of Kerala.

A suitable cross bred combination of duck for increased productivity was assessed. Khaki campbell x local breed crosses were found to be good egg producers but found to be highly sensitive to aflatoxin in the diet. Combination of white pekín and local strain was found to be good meat producers.

The performance of various breeds of rabbits and their crosses were assessed to identify a combination suitable to the environmental conditions of Kerala. Crosses involving Soviet Chinchilla, Grey giant, New-zealand white and the indigenous breeds were studied. The performance of Soviet Chinchilla was found better.

Extensive studies were conducted to study the factors responsible for infertility and subfertility and delayed maturity of cross-bred cattle (combinations of Jersey and Swiss brown) of Kerala. Of the various factors identified genital infections, qualitative and quantitative micronutrient deficiency, hypothyroidism and developmental abnormalities were identified. XX/PY and XX/XO Chimerism and polyploidy were also identified to cause infertility.

Many unconventional feed sources were identified, their nutrient values assessed and rations for livestock have been formulated incorporating these with beneficial effect. Tapioca leaf meal, tapioca starch waste, rubber wood cake, tea waste, decorticated tamarind seed powder, cocoa pod, cocoa pulp and coffee husk are some of the byproducts identified. Technology for preparation of silage from water hyacinth and utilisation of bypass proteins was perfected.

A new vaccine was developed which was found very effective against Ranikhet disease in poultry using a local mesogenic strain of RDV (NDV-M).

Extensive investigations were conducted on mycotoxicosis with special reference to Aflatoxin, Ochratoxin, Citrinin and Fusarium toxins, since compounded livestock feed has been found to be highly contaminated with these toxins. The molecular biology, pathogenesis, clinical manifestation and preventive aspects were investigated. The mechanism of immunosuppression and teratogenicity due to some of these mycotoxins was elucidated.

Association of a virus in ethmoid carcinoma was demonstrated electron-microscopically. The cocarcinogenic effect of other factors and treatment schedules have been carried out.

The immunosuppressive effect of Infectious Bursal disease, Inclusion body hepatitis and Ochratoxins were established which resulted in vaccine failures and secondary diseases.

Studies were conducted on bacterial resistance to antibiotics and it was found that resistance to E. coli strains to gentamicin and trimethoprim are not plasmid borne and not transmissible. R-plasmids were characterised from bacteria isolated from normal and diseased conditions in livestock.

Indepth studies were conducted on various aspects of Avian influenza virus, duck plague, and Corynebacterium pseudotuberculosis.

Studies were on the pathogenicity and treatment of Coccidia infecting chicken and the helminth parasites of ducks and the efficacy of irradiated larval vaccines.

Anaesthetics, both for general and regional anaesthesia were identified for goats.

A comprehensive study on the toxic effects of industrial effluents on animals with special reference to sulphur dioxide, sulphates, chromium chlorides, mercury and organic chemicals. This study was conducted in and around the industrial belts of Kerala. Different types of syndromes were identified.

Detailed investigations were conducted on the morphometry, physiological responses, haematology, serum biochemistry including free aminoacids and enzymes, parasites and their treatment, Karyology immune responses, nutritional requirements and management practices of the Asian elephant under captivity.

The technology for tranquilisation and capture of elephants using chemicals and projectile syringes were perfected. The drug schedule, the antidote, and other management factors associated with chemical capture and translocation were standardised.

TRANSFER OF TECHNOLOGY

Group Management in Farming—An innovative Extension approach developed under the Lab-to-land programme.

Rice production in Kerala has been facing serious crisis during the last couple of decades due to various constraints. The major constraints are.

- i) Extreme marginalisation of rice lands which makes them operationally non-viable.
- ii) Scattered nature of rice lands possessed by individual farmers.
- iii) Absence of full-time farmers in 80% of the operational holdings,
- iv) Inadequate coverage of irrigation facilities,
- v) Non-uniformity in agricultural operations including plant protection measures.
- vi) High cost and non-availability of labour.

In order to make rice cultivation profitable, it was necessary to reduce the cost of cultivation and to increase the productivity by making farm operations efficient and cost effective by adopting scientific practices of cultivation and by reaping the economics of scale even by the small and marginal rice cultivators in the state. Application of latest agricultural technologies in a cost effective manner even to the small and marginal farmers on a collective management-basis could solve many a problem in rice cultivation in the state.

Encouraged by the success of group approach in farming practiced in Java, Bali, Taiwan, Malaysia, Mexico, Kerala etc the Kerala Agricultural University initiated in 1975, an innovative extension management approach in dairy farming in the adopted villages of the College of Agriculture, Vellayani. This approach was replicated successfully in rice cultivation by the Kerala Agricultural University under the Lab-to-Land programme of the ICAR since 1984 at Palisseery and Kadambodu in Trichur District, Thuravoor in Ernakulam District and Kadukkankunnu in Palghat District. The Group Management approach envisages super-imposing of group management of key farm operations over individual farm ownership and initiative of farmers. A conspicuous feature of this approach is that the farmers are motivated to form small groups to pool their resources and to handle key farm operations without surrendering the ownership of their land. However, this demands the identification of technological parameters to be brought under Group Management and dynamics of group management treating group management as a critical input.

This approach has resulted not only in about 30% (average) cost reduction in the selected practices brought under group management but also upto threefold increase in productivity and production of rice.

Drawing from its experiences in this new approach particularly from its Thuravoor Centre, the University developed a model for implementing Group management in rice cultivation. It is a matter of pride and pleasure that based on the findings of KAU on Group Management, the Government of Kerala decided to adopt the Group Management in Farming for rice development in the State. Popularly termed as Group Farming, the programme envisages to cover an area of 62,000 ha during the Kharif season throughout the State which will be extended to three lakh hectares to paddy land in next three years.

CENTRAL TRAINING INSTITUTE, MANNUTHY

The Central Training Institute (CTI) at Mannuthy with a Training Service Scheme Unit at the College of Agriculture, Vellayani came into

being in October, 1986 as a Special Sub Project II under the World Bank assisted National Agricultural Extension Project—primarily to meet the training needs of the higher level functionaries of the T&V System operated by the State Department of Agriculture and to co-ordinate the training activities of the University.

Although the project was to function for a period of three years from 1986-87 with a budget provision of Rs. 42 lakhs to be shared by Govt. of India and Govt. of Kerala on a 50:50 basis the project period has been extended to 1989-90.

Apart from training programmes conducted for the State Department of Agriculture, training programmes are also conducted for higher level officers of the other state Departments such as Animal Husbandry, Rural Development, Dairy Development, Fisheries, Forestry etc.

The Central Training Institute is also engaged in conducting annual National level seminar cum Workshops in Agricultural Journalism and Cashew Production Technology for Subject Matter Specialists in the country.

Training programmes for Scientists of the Kerala Agricultural University, Progressive farmers, Voluntary organisations etc. are also organised periodically at the different campuses of the Kerala Agricultural University.

The Central Training Institute has so far trained 3261 officers through 90 training courses.

CENTRE OF ADVANCED TRAINING IN PLANTATION CROPS

The Government of India have accorded sanction to start a Centre of Advanced training in Plantation Crops (CATPC) in the Kerala Agri. University as a Special Sub Project of NAEP for five years, from 1988-89 at a total cost of Rs. 31.45 lakhs with 100% financial assistance. The major objective of this institution is to serve as a centre of training in Plantation Crops for policy makers Administrators and senior officers of the concerned departments in India.

The specific objectives of the project are:

- i. to centrally co-ordinate and organise advanced training programmes related to Plantation Crop Technology for the benefit of senior level extension personnel in the Departments of Agriculture and Horticulture, research personnel, Senior officials of input agencies in the country.

ii. to organise National Level and Regional Level Workshops/ consultancy on policies, planning related to plantation crops for planners, policy makers, Senior Officials, Scientists, Marketing Managers, Directors, Bankers, Crop Co-ordinators of ICAR etc.;

iii. to organise training for senior officers of Development Departments, Commodity Boards, Development Directorates etc. in the country in Development Management and Extension Management including planning, implementing and monitoring of development programmes related to plantation crops;

iv. to organise specialised training programmes in Plantation Crops Technology for the Subject Matter Specialists working in the Departments of Agriculture and Horticulture, Officers from Commodity Boards etc. in the various states in the country;

v. to train Master Trainers from various Agricultural Universities in the country who train Subject Matter Specialists in Training Methodology, Curricula Developmental teaching, pre and post education technique diagnostic skills etc;

vi. to evaluate the training programmes and to do follow up studies and to compile and communicate the feed back information relating to Plantation Crops Technology to the researchers.

116/200/8/89

Kerala Agricultural University Press, Mannuthy