

Thankamma Dhomas Libravian.


KERALA

## AGRICULTURAL UNIVERSITY

## college of agriculture

Vellayani, Trivandrum

| chief editor | Dr N SADANANDAN |
| :--- | :--- |
| staff editor | Dr V GOPINATHAN NAIR |
| student editor | JOSE JOSEPH |

Thanks are due to

Cover
'Struggle for existence'
Des gned by A K Sivanandan

Advertisers
M/s Sastha Printers
Shri M S Kuriakose
(Photog aphe)

P K VASUDEVAN NAIR
Trivandrum
Chief Minister, Kerala

## Message

> I am extremely glad to learn that College of Agriculture is bringing out a College Magazine I wish you all success in your venture

Sd/
(P K VASUDEVAN NAIR)


Shri A. L. JACOB
Minister for Agriculture and Pro-chancellor


## A L JACOB

Minister for Agriculture

## Message

Indias current production advance in agriculture has shown that the country s small and often illiterate farmers are highly receptive to scientific production techniques and will take to new production methods if they can be convinced about their effectiveness on their own frelds Many eminent economists have argued that technology reforms are not so important for farmers of India as mstitutional and social reforms But the recent Indian experience has amply shown that one of the foremost requirements of increased agricultural output in developing countries like India is a new kind of agricultural technology with emphasis on high levels of yields The process of modernisation of Indian agriculture has only just started The potential for further advances is enormous The graduates coming out of our Agricultural Universities can do a lot of things for changing the very complexion of our agricultural activities

I send my hearty qreetings and good wishes to the annual college magazine of the College of Agriculture Vellayan!

Sd -
(A L JACOB)


Shri N. KALEESWARAN
Vice-Chancellor


## kerala agricultural university

N KALEESWARAN<br>Vice-Chancellor

Vellanıkkara 680651
Trıchur Dist (Kerala)
9th Feb 1979

## Message


#### Abstract

The history of successful agriculture and the power that goes with it has largely been a story of knowledge and technology A tremendous agricultural revolution in India, likely to change its face for ever, is now only a matter of time The students of agriculture who are going to be the active agents of tomorrow $s$ revolution should get themselves prepared to accept that challenge


With best wishes


Dr. N. SADANANDAN
Dean

## VISITORS IN THE CAMPUS



Shri. Nripan Chakrabarthy Chief Minister of Tripura
Addresses the students.


Mr. B. Hayden,
Leader of Opposition,
Australian Parliament
Visits the work experience plots.


## COLLEGE UNION


R. Muraleedhara Prasad President


Abdul Gaffar General Secretary

K. Abdul Karim

Vice President


Thomas Mathew Associate Secretary


Mohammed Yasin Komalam Secretary, Arts Club

R. Nanda Kumar

Secretary, Camera Club.

George Mathew
Class Representative
III Year


Rajan Mathew Secretary, Planning forum

S. Devanesan
P. G. Representative


Saju Peter
Class Representative
II Year

S. Mohanan

Class Representative IV Year


Pradeep Naik Class Representative 1 Year

general council members, kerala agricultural university


Ranian S. Kariodai

## HOSTEL EXECUTIVE




Dr. K. P. Rajaram
Asst. Warden, P. G. Hostel


Dr. Abraham Jacob Asst. Warden, Men's Hostel

T. V. Dilipchandran Hostel Secretary Men's Hostel


Smt. K. J. Alice Asst. Warden, Ladies Hostel

E. K. Lalitha Bhai

Hostel Secretary
Ladies Hostel


## 














 ๔（ユ）












## Contents

| Integrated rural development-concept and a model - |  | A G G Menon and M M Hussaın |
| :---: | :---: | :---: |
|  |  |  |
| Blue green algae for increased rice yields | - | $V$ Krishna Kumar |
| Wings of pestilence | -- | Dr D Dale |
| Nutrition Extension Need of the hour | - | R Muraleedhara Prasad |
| Water balance in insects | - | P N Ravindranath |
| Rcle of Agriculture in economic development | - | P Rajendran |
| Isotopes in Entomological Research | - | George Koshy |
| Potato in Meghalaya |  | John K Durong |
| Agricultural planning A new approach | - | R Prakash |
| To masks all over | - | Asha D Varma |
| A silly little conversation? | - | Shirley A Baby |
| My dream | - | $P$ Mahendran |
| Well Come death | - | $S$ Rajeena |
| A silent despar | - | $S$ Sobhana |
| Pulses - the poor man s meat | - | $K$ Sivan Pilla |
| You can | - | Sverup John |
| The insect host plant selection | - | S Devanesan |
| Death | - | P J Sivakumar |
| Musical meanderings | - | Bijou Albin |
| My dear friend Guitar | - | John K Durong |
| Insectivorous plants | - | S G Sreekumar |
| Last letter | - | VK Gırıja |
| A collection of quotations | - | R Lata |
| The history of tropical spices | - | PA Mathew |

# Integrated Rural DevelopmentConcept and a model 

A G G. MENON \& M MOHAMED HUSSAIN

In India over $80 \%$ of the population live in about 558000 scattered village settlements For reasons of equity and expediency rural development has assumed the highest priority not only in India but in most of the developing countries also

During the Colonial rule in the country there was virtual stagnation or even deterioration in the rural economy due to what Mahatma Gandhı called divorce between intellect and labour Thus Agriculture which is the basic industry of rural India was regarded as a profession which needs only brawn and no brain Experience shows that for rural deve lopment to be self sustaining it is essential that it include a self supporting agriculture which can provide surpluses for financing social overhead facilities and services on a continuing basis

With the introduction of planning in India, the importance of rural development was highlighted and that has resulted in the launching of Community Development programme in 1952 supported in later years by the National Extension Service and the setting up of a network of Panchayat Raj Institutions

The deliberations of the reth Science Congress held at Waltair in January, 1976 stressed for the frrst time the theme of Science and Integrated Rural Development-an agenda for action Thus the latest concepts on Integrated Rural Development came in to being Integrated Rural Development is defind in this context as the development which can help to increase the purchasing power of the rural poor through the generation of greater opportunities for gainfull employment

On the recommendation of the science confer ence in May 1976, a working group was set up by
the Department of Rural Development with repres entatives of the Department of Agricultural research and education Department of Science and technology, planning commission and the council of scientific and industrial research to select atleast one district in each state for initiating pilot projects in Integrated Rural Development

The choice of the districts was made based on the following criteria
a) Economically backward districts that have considerable development potential
b) Districts in which problems of rural unemployment and under employment are acute
c) Districts that already have a certain basic developmental infrastructure.
d) Districts in which scientific and technological institutions have already begun working

With the completion of this basic outline the overall responsibility for implementing the programme was entrusted to the Department of Rural Development in the Ministry of Agriculture and Irrigation The central coordination committee on Rural Development and Employment under the chairmanship of Member (Agriculture) Planning Commission was entrusted with the task of providing overall guidance and approval

The Government of India have already announced that within the next 10 years opportunities for gainful employment should be assured to everyone born in the country This will be possible through the scientific utilisation of available resources through integrated rural and urban development To materialise the above target by organising a scientific upgrading of the rural economy, a core
dealing with related issues of development Attempts should be made through such linkages to bring in the necessary supplies and services that the community cannot provide for itself

6 The feed back from the project as it is underway should be planned technically The different groups mentioned working in co-ordination can be the forums for feed back in the existing situation

## A Model for rural development

As pointed out earlier to make the Rural deve lopment viable in countries like India it is necessary to have sustained growth in rural incomes derived primarily from agriculture By and large Agricultural Development has been mostly benefiting the rural rich farmers in India In a country like India where the lion s share of the farming community is constituted by small and marginal farmers we cannot afford to allow this to continue if agriculture is to be made self supportıng

In India since self supporting agriculture is the key to the self sustaining rural development a model for rural development should benefit subsequently the small farmers marginal farmers agricultural labourers and other workers in rural communities

Following six basic principles seem to have relevance to the attainment of viable rural development in our country

## 1. Labour intensive mixed farming

The most abundant resource of the poor farmers and rural workers is labour which is often underemployed or unemployed and capital is a scarce resource for them Therefore labour intensive agricultural technology must be employed to the maximum extent possible Mixed crop culture should be mixed with cattle rearing fish culture pig rearing, poultry etc and viable technology to recycle the products from both should be developed for example fodder grown in coconut gardens can be utilised for rearing cattle and the dung and urine from the cattle can be utilised for manuring the crops

## 2 Small Industry and Cottage Industry

Labour intensive small industries with low capital using local resources should be established Cottage Industries like candle making chalk making match making making spare parts of equipments etc should also be encouraged These are designed to supple ment the employment opportunities in the farmfront

## 3 Minor development Works

Employment generating minor development works with high labour content should be planned
and axecuted Construction of roads tanks etc as well as social overhead facilities like school buildings etc can be thought of in this context For this as far as possible local materials should be utilised

## 4 Self help

The model for integrated rural development should rest on a foundation of local self help The local people should assume responsibilities for raising a reasonable part of the resources needed for development

## 5 Organisation

The preparation and implementation of self sustaining rural development programmes is a long term task which requires much planning and support from the village community It is therefore necessary to have adequate organisational structures in the villages Probably a number of Small Farmers Associations with 50 or 60 members in each association will do the job Large organisational set up is likely to fall in rendering organisational support to the farmers Any way some organisations between the farm family and village cooperatives will be necessary to meet the needs of individual farm families Each such family association can become member of a cooperative instead of individual joining the cooperatives

## 6 Development Centres

Rural development is essentially a part of regional and national development If rural development is to proceed beyond minimal levels the gap between rural villages and the metropolis should be bridged This big gap between the villages and cities is a characteristic feature of less developed countries Establishment of a hierarchy of development centres that is a wide dispersion of small rural market centres connected with a small number of small towns supplying a wider range of services with these towns in turn connected to larger towns or cities and so coupled with employment generating occupations in villages as detailed above will help to check the migration of villagers to towns and cities

The above model need to be adopted to suit varying local situations it should be remembered that rural development should be location specific because problems vary with pepole soll climate, settlement patterns ethnic traditions and similar factors which prevent uniform prescription for all types of situations It is also better to bear in mind that all of the problems cannot possibly be attacked and solved by any one integrated approach in its first few years but requires a continuous and co operative effort it is this vision of total development which is the prime element in an integrated rural development scheme

# val（uc）  

colcongos $\cos$


 anjoasm


上ากา





 ๑มีร＂ณ18




 のตฐาถวแั＂

|  （acromonา | อarmoาce कัッ1 a่าอก็＂ H2 |  <br>  | noomm maser． <br>  <br>  （B） |
| :---: | :---: | :---: | :---: |
|  36 Al © 0 ． | 1020 | 16 | 960 |
|  18 カ1 ஸフロ єวกคกณு． | 1146 | 21 | 1260 |
|  <br>  <br> 18 A1 © 0. amjon． | 1179 | 29 | 1740 |














# Blue green algae for increased rice yields 

V KRISHNA KUMAR

The successful crop production in the tropics largely looms around an efficient and economic supply of nitrogen an element required in the largest quantity in comparison with other indispensable ones The problem is accentuated by the present practices to step up crop production through the use of high yielding fertilizer responsive crop varieties

Rice the staple food crop of India is largely grown in submerged soils which often exhibit remar kable ability to supply appreciable amounts of nitrogen to successive crops Chief sources from which soil nitrogen is replenished are precipitation plant and anımal wastes and biological fixation Many of the blue green algae have been deemed to play a major role in biological fixation as other nitrogen fixers dont find anaerobic (submerged) environment favourable for their activity Being capable of photosynthesis the algae need not rely upon external sources of carbohydrate for energy an exclusive merit in their favour for reliance as potential contributors to the nitrogen economy of the soll

Studies at varrous research centres hold up the hope that blue green algae may be used in paddy fields to enrich the soll with nitrogen The value of blue green algae was known to Vietnamese from ancient times In North Vietnam azolla has been well known and is being utilized as green manure for centuries

The blue green algae are primitive plants having certain resemblance to bacteria but better evolved by virtue of their ability to synthesise their own food as green plants In structure and organisation they are simple unit or multicellular with chlorophyll and other pigments giving characteristic brown red and blue colours They are widely distributed in nature and exists practically in all situations where moisture is available

Apart from fixing atmospheric nitrogen the algae also contribute organic matter conserve leach able plant nutrients synthesize and liberate growth promoting substances like auxins and aminoacids They also help in aerating paddy roots They utilise carbondioxide released in root respiration for photosynthesis and release oxygen which aerates the root zone of rice It is a unique feafure for partially meeting the oxygen requirement of the roots of rice plant in the anaerobic environment of the water logged soll

Nitrogen fixation by algae may also be accelerated in association with bacteria like azoto bacter and clostridium

## Pioneering work on Algae

The results of the various investigations con ducted in India can be summarised as follows

1 The growth of and nitrogen fixation by algae are considerably increased in the presence of the crop

2 More than $80 \%$ of the fixation was known to occur in the first 4 weeks after transplantation

3 Application of superphosphate to supply $25-27 \mathrm{~kg}$ phosphoric acıd/ac stımulated nitrogen fixation only in soils relatively poor in this nutrient

4 In certain soils there was evidence that application of molybdenum with phosphate might bring about greater fixation of nitrogen than phosphate alone

Thus the earlier efforts gave some of the essential features of the process which offered sufficient promise of its economic utility and further explotation

In the rice fields of Uttarpradesh and Bihar occurs a dominant and widespread nitrogen fixing algal community of blue green algae constituted mainly
by Aulosira ferti/issima intermingled with Anabaena ambigua and Cy/indorspermum gorakhpur ense Observations on rice solls of Madras and Kerala reveal ubiquitous occurrence of Aulosira fertı lissima which appears to have great affinity for rice field conditions

From the various surveys conducted in different parts of India it has been found that blue green algae shows an overwhelming preponderance over the other classes of algae in India against the temperate soils where the reverse is the case The principal genus containing maximum number of nitrogen fixing species is Cy/indrospermum There are about 27 species of blue green algae that are capable of nitrogen fixation Anabena azolla is one among them

Two varteties of blue green algae are reported in Vietnam the green azolla with green upper lamellae and the purple azolla with green upper and pink lower lamellae

## Azolla as a fertilizer

The floating fern azolla is found in India in shallow ponds ditches and channels containing stagnant water mostly in winter season The plants consist of a floating branched rhizome with small alternate overlapping bilobed leaves and simple roots which hang down into the water and it reproduces mostly vegetatively although spores are also formed The nitrogen fixing blue green algae Anabaena azol/a is always found in the cavities of dorsal leaves as symbiont which fixes atmospheric nitrogen necessary for the growth of the plant

Azolla is utilized as a green manure in a number of countries like North Vietnam Thalland China etc However no attempt was made earlier on the cultivation and utilization of azolla in rice fields of India Now it is being successfully multiplied by scientists at CRRI cuttack and IARI New Delhı Azolla Production

Multiplication of azolla can be done in rice fields throughout the year in small plots of $8 \mathrm{~m}^{2}$ area as well as in cemented tanks of $6 \mathrm{~m}^{2}$ containing about 6 of soll ( 15 cm ) Water is to be maintained in fields upto $2-10 \mathrm{~cm}$ and in tanks 20 cm An intoculum of $01-03 \mathrm{~kg} / \mathrm{lm}^{2}$ produces 815 tonnes of green matter /ha in 820 days it in capable of producing nearly $10 \mathrm{t} /$ ha of green matter in 8 days to give $25 \mathrm{~kg} / \mathrm{ha}$ nitrogen in temperature ranges of $15-40^{\circ} \mathrm{C}$ Superphosphate at $46 \mathrm{~kg} \mathrm{P}_{2} \mathrm{O}_{5}$ / ha is to be spread every week 2 such layers are sufficient to supply adequate nitrogen for entire crop The solls of $p^{H} 67$ support best growth of azolla.

Continuous application of algae to the field for at least 3 years sustans the high crop yield with less fertiliser in the following cropping season with favourable conditions

Azolla can be grown in the paddy field etther before transplanting or after preparatory cultivation It can also be grown after transplanting and used as a green manure by drying the field once lightly at the tillering period A clear gap of 1520 days should be allowed if it is used as a green manure before transplanting between field preparation and transplanting to allow for its growth Ten tonnes of azolla grown in one ha of nice field can contribute 25 kg nitrogen besides a good amount of phos phorus it decomposes within 810 days after incorporation in soil and compost of azolla can be prepared just by keeping the green matter in moist conditions for a few days

## Effect of Azolla on yield

The experiments conducted at CRRI, Cuttack showed an increase in grain yield upto $47 \%$ ( 115 t/ha) over control when $810 \mathrm{t} / \mathrm{ha}$ of azolla was in corporated in soll or allowed to decompose without incorporation

The response towards azolla was comparatively better in rabi than kharif Short or medium duration varieties responded better than late duration varieties The height tiller dry matter number and weight of panicles 1000 grain weight and nitrogen content in plants and grains were also more in azolla incorporated treatments

## Economics of algal use

It is reported that 10 kg of blue green algae can lead to an increased paddy yield worth Rs 300 / The cost of production of 1 kg of algae comes to about one rupes only

## Recommendations

* Multiplication of algae should be carried out where assured irrigation facilities are available it should be done during middle of May or first week of June for using in Kharif
* Phosphorus must be applied as superphosphate or in other available forms Greater attention should be taken against pests
* If it is grown in rice fields after transplantation, water should be drained after formation of a layer or It should be incorporated in soll by other means
* The culture should be multiplied in compartmentalized fields and the larger fields are divided into smaller ones to avoid accumulation of algae to one side


# Wings of Pestilence 

Dr D DALE

Of all insects mosquitoes are the most familiar to man and perhaps the most disliked Virtually every person on earth knows what a mosquito is and has been bitten by it All our ancestors were bitten by them too for mosquitoes have been on earthfor considerably longer than human beings have They were fully evolved and thirsty for blood 50 million years before anything remotely resembling a man appeared on this planet Mosquitoes had a very bad reputation among ancient writers One of them recorded that swarms of mosquitoes would bite the eyelids of lions in Mesopotamia until the poor beasts went mad plunged into the rivers and drowned

The study of mosquitoes proved to be a rich field There are about 2700 species of mosquitoes ranging from enormous nectar feeders to tiny swampbreeders Some are as drab as dust, others as brilliant as the flowers they frequent Some feed on birds wild rodents or monkeys a few choose only flower juices The females of one Malayan genus steal food from ants by inserting a bulbous proboscis into the ant s mouth and sucking up honeydew the ant has somehow gathered from aphids

The adult mosquito is only one manifestation of a being whose life is a series of startling changes of form Born from the egg as wriggly larva a fraction of an inch long the mosquito passes through four instars Out of its last larval stage evolves the pupa Emerging from the pupa the mosquito is an almost mature adult as different in form from its larval existence as it is from an egg

As a larva the mosquito is an aquatic creature perfectly adapted to a life in water it swims by undulating the body The larva feeds on rotten leaves micro organisms and it is capable of sucking several quarts of water through its tiny body every day to filter out nourishment As a pupa it resembles a peaseed with flared horns which actually are breathing tubes It moves in an erratic jerky fashion by flexing its belly, and it has rudimentary sex organs

As adults of course mosquitoes are differen trated by sex It is the female--and only the femalethat feeds on blood and she does this out of sheer necessity The biting drive is associated more with reproduction than with nourishment Drifting rest lessly on the wind she searches until she finds the warm moist air from a human being or some other anımal then by maintaining a narrowing zigzagging flight pattern she follows the air current downward Her proboscis will penetrate the toughest hide for it is far more than a simple suction pump It consists of a long protruding lower lip containing two long pairs of cutting scalpels an upper lip food tube through which blood can be drawn into her gut and a saliva tube down which dribble the secretions that cause agglutination of red corpuscles prevent coagulation and set off the familiar allergic reactions -redness swelling and itching

Having fed full the female mosquito flies away carrying her swollen belly like a sack of loot Her feast stimulates her to begin a cycle of ovulation The sperm from a single copulation will remain fertile Indefinitely and thus will provide the female with a life time supply although she may lay upto twenty separate batches of eggs each preceded by a fresh meal of blood from some unfortunate host

As for the male mosquito he is a playboy who lives on nectar and love After a day or two of emergence he begins his mating flight lured by the irresistible hum of the female in flight. Mating like other mosquito activities calls up a wide range of idosyncrasies Some male mosquitoes seek to copulate before some after the female has had a meal of blood A few settle on her while she is in the midst of eating, and there is one aggressive species in New Zealand that seeks out a young female before she is properly out of the pupa and helps her disrobe to get on with the union

It is the habit of blood feeding that makes the female mosquito a vector of some dreaded diseases-
a transmitter of infection from man to man from animal to anımal and from anımal to man The female of certain species of mosquitoes is responsible for the spread of major diseases like filariasis, denuge, yellow fever and malaria The early control measures against mosquitoes were drying up of breeding sites and spraying with oil Then by the advent of DDT its residual spraying on walls and water sheets became the most popular mosquito-Control method Malaria was halted in many regions-including India-where it had debilitated the population for centuries By the frequent and indiscriminate use of insecticides many mosquito strains have almost become resistant to DDT and its allies leading to a victorious come-back of

Malaria and other mosquito transmitted diseases
A pilot project under the joint auspiecs of WHO and ICMR was conducted in a village near New Delhs to assess the feasibility of using chemo sterilants for mosquito control Due to various sociological and political problems the project had to be abandoned eventhough partial success was claumed by the scientists who operated it Probably the latest glimmer of light shone in the dark picture of mosquito control is the use of juvenile hormone analogues Recent reports have shown that Attosid SRIO a hormonal analogue could give complete control of even insecticide resistant mosquitoes with an application as ittle as four tenths of an ounce per acre

# Get to know the techniques for increased coconut Production 

Read

## indian coconut jodrnal.

(Englısh Monthly)
INDIAN NALIKERA JOURNAL
(Malayalam-Monthly)

Published by
THE DIRECTORATE OF COCONUT DEVELOPMENT Ernakulam Cochin-11

SUBSCRIPTION (INLAND)
INDIAN COCONUT JOURNAL
Annual - Rs 600
Single Copy - Re 060
INDIAN NALIKERA JOURNAL
Rs 500
Re 0.50

# Nutrition Extension : Need of the hour 

R MURALEEDHARA PRASAD

Natıons talk about what they lack America talks about peace Germany talks about unity France about glory Russia about freedom, and India about food so said Reston It is true that with the aggravation of the food shortage in our country after the partition of the subcontinent and conse quent loss of our grain bowl achievement of self sufficiency in food both by bringing in more areas under cultivation and by increasing productivity rightly received high prionity in our development programmes However the scope for horizontal expansion was rather limited since most of our cultivable land was already under cultivation and hence the thrust was placed on increased productivity by the adoption of improved technology Towards this end a network of extension agencies all over India has been established so that the available agricultural technology of improved varieties and their management practices could be taken to the doors of the farmer Because of these efforts we could increase our food production to a large extent but we did not appear to bridge the gap between food production and food requirement Though, theoretically speaking, the possibilities of increasing productivity are still immene the resource constraints of capital and other inputs together with the various problems created by intensive agriculture make the translation of the theoretical into the practical very difficult

While this is one side of the picture of agricultural situation in India, wherein we find that our farmers assisted by agricultural scientists are engaged in bringing about and sustaining the green revolution what we see on the other side is that all our achieve ments in the food front are being nullified due to the lack of understanding about nutritional aspects and faulty direction of the so called nutrition experts
whose duty is to provide the correct perspective and technical guidance But how? Let us see

First and foremost there has been a sustaned propaganda about the so called superiority of non vegetarian over vegetarian food in the press public platforms and in almost all spheres of life To some extent our nutrition scientists should hold themselves responsible for this We were told by our scientists that vegetarian foods could not supply all the nutri ents needed for body building and for physical strength and stamına As a consequence of such propaganda meat eating has now become the fashion and among those who can afford it there has been a changeover to flesh foods To cope with this increasing demand there has come about an enormous increase in our livestock population which in turn compete with human beings for food Such an action even if we can escape saying the fact that our anımals feed largely on the by products of agriculture and that they give us something in return say in the form of milk meat and eggs it can be seen in the ultimate analysis that the increase in their population leads to a huge drain in our agricultural production The livestock population of our countryis calculated to be about $70 \%$ of the human This is indeed a great problem to us and if we compare the humans and anımals not in terms of numbers but in terms of their relative weights relative areas required and gross calories of feed consumed we can have an idea of the enormity of the problem At present, our anımals are being reared by and large on crop residues and both dry and green fodders They are fed with the bran and oll cakes but get very little of grains And if we want to bring about a significant improvement in the production of animal foods we have to improve the quality of our animals Quality animals need quality feed containing a
sizeable proportion of grains and other foods of plant origin fit for human consumption which means that we shall be left with less food

Further Dr L Ramachandran in his book India s Food Problem-A New Approach (1977) elaborates the dangerous trends of increase in the livestock population inthe following words The present food shortage is the direct consequence of the misplaced emphasis on the increased production and consumption of anımal foods The so called white revolution has eaten up the benefit of the green revolution and now threatens to eat up the human population as well We have to put a stop to this dangerous trend unless we consider it desirable to ruin ourselves economically and politically by continuing to depend on imports and even then keep the majority of the population illfed and underfed so that a small minority may feed themselves with a variety of so called delicacies made from meat and eggs

Thus the prospects for increasing production of anımal products being bleak as it is seen we have to go in for a substitute for the animal products Leafy vegetables which nutritionally speaking are superior to all foods in the vegetable kingdom can serve as an excellent substitute for milk With the exception of fats leaves are equal to milk in respect of all the other nutrients if not superior The protein content of leaves generally ranges from 2 to $7 \%$ as compared with $32 \%$ in cow s milk and $43 \%$ in buffalos Leaves are also rich in Vit A Vit C riboflavin thiamin niacin iron and calcium Similarly most of the indigenous fruits are rich in Vitamin and minerals Thus the possibility of using locally avarlable and existing varieties of leafy vegetables and fruits which are nutritious and tasty being immense urgent steps should be taken to educate the rural people on human nutrition and on possibility of meeting the food requirements by using locally avaılable food articles

Now of late some nutrition experts have started saying that a judicious combination of vegetable foods can be quite adequate nutritionally But here again they have created the impression that it will only be the second best They are not prepared to consider vegetable foods as the best because they are still under the impression that there are certain nutrients, such as proteins contain all the essentral amino acids which only anımal foods can supply Is it not a mistaken notion? Definitely How? we can see

## Quality of proteins-Essential amıno acids

All proteins are made up of amıno acids There are about 22 different amino acids and from the permutations and combinations of these thousands of different proteins needed by human body are synthesised in the tissues Out of these 22 there are many which need not be supplied in food, because the body can synthesise these from other amino acids and nitrogenous substances present in food These are called non essential amino acids But there are 8 amino acids which cannot be synthesised by the body and which must be supplied through food These are known as essential amıno acids

Dr Ramachandran clearly explains that there is no scientific basis for the popular notion that animal proterns are indispensable for growth and maintenance He writes cannibals eating one another eat exactly the same proteins which are present in their own bodies, but the proterns will not be absorbed as such All proterns are broken up into amino acids during digestion and it is only as amino acids that they enter the blood and are carried to the tissues where they are reassembled to give the proterns of body tissue There is therefore no advantage to be gained by consuming protems which are exactly the same as or similar to those present in our body tissues This is neither possible nor necessary All that is necessary is that the essential amıno acids must be supplied by the diet as far as possible, in the proportion in which the human body requires them it is possible to devise any number of combinations of foods of vegetable origin which can meet this requirement

Secondly we see that our nutrition scientists as a community have all along been subserving the interests of the food technologists and food processors say in the name of the refinement of foods, especially cereals which deprive us of vital nutrients essential for growth and development (Unprejudiced nutrition scientists may forgive) This practice is harmful to any country and more so for India than elsewhere due to two reasons Firstly the majority of Indians are rice eaters and the loss that takes place by refinement is the maximum in the case of nice Secondly average Indian diet consists exclu sively of cereals and the loss from them on account of refinement is not made good from other sources asit happens to be in more developed countries

## Cost of refinement

Before discussing the effect of refinement of rice grain, it will be useful to know about the
structure of rice gran The whole rice means the grain we get by dehusking paddy so carefully that only the husk is removed which consists of the following parts-(a) the pericarp which is a fibrous outer layer covering the grain fairly rich in valuable nutrients (b) the aleurone layer which is just beneath the pericarp very rich in valuable nutrients. (c) the germ or embryo situated at the lower end of the grain which is its most nutritious part and (d) the endosperm which is the inner core of the grain It consists mainly of starch which contains very little of nutrients

According to the two common ways of obtaining rice from paddy we have the following two kinds of rice (1) Raw milled rice (white rice) which is the most common and most popular and (2) Parboıled milled rice which comes next in importance Milling removes the peripheral layers of the grain including the pericarp and the aleurone layers and also the germ at the lower tip of the grain Milling includes polishing also and in excessive polishing the portion of the endosperm close to the aleurone layer may also be rubbed off Grist (1975) gives the average figures of various products obtained by milling and polishing as whole rice - $50 \%$ broken rice $17 \%$, bran $10 \%$ meal $\mathbf{3} \%$ and husk $20 \%$ Thus if there is no polishing the yield of rice is $80 \%$ and because of polishing only $67 \%$ of rice including broken rice is obtained The loss sustained in milling and polishing is thus $\frac{80-67}{80} \times 100=1625 \%$ if excessive polishing is resorted to the loss will be even more While this is staggering enough qualitative loss is far more serious Not only do the rice polishings especially the germ of rice contain a much higher proportion of protein than the polished gran that we consume but their protein are superior in quality also and have a higher score than those of polished rice According to FAO/WHO Expert Committee Report (1973), in the case of infants preschool children and school going children white nice is very inadequate whole rice is slightly inadequate and rice germ is more than adequate in respect of lysine which is the limiting amino acid in Indian diets In the case of children belonging to poor or not-so well to do families this loss is never
made good because their diets consist almost entirely of cereals with nothing else to supplement

Similarly there is also a substantial loss of fat The rice bran which is thrown away or is used as anımal or poultry feed contains about $16 \%$ of fat Also unpolished rice is a better source of calcium and phosphorus than polished rice In respect of iron the former is twice as rich as the latter Unpolished rice is 3 to 4 times as rich as polished rice in the case of vitaminsof the $B$ group such as thiamine riboflavinand niacin The story of waste does not end here also Since rice which is marketed will be far from clean it will be washed repeatedly to remove the dirt Along with this the fine powdery bran a little of which will be present in milled rice will be completely lost The water soluble vitamıns are also lost Then what else is left except starch?

It has been conclusively proved that malnutr: tion is the most important single cause of our high maternal infant and child mortality the stunted growth of our children and the prevalence of various disorders among pregnant women nursing mothers and infants and children It cannot be denied that the practice of milling and polishing of rice is the most important single cause of such malnutrition because it leads to the loss of protein fats, minerals and vitamins

## Need for Nutrition Extension urged

A close examination of the diet of Indians reveals that the above discussed are only a few of sımılar such factors which hinder the quality as well quantity of foodgrains It is better for our country's progress that she may change over from livestock industry to agriculture and our people may change over from non vegetarian to vegetarian diet $A$ mere change of existing food habits of our people can very well improve the quality of Indian dietary to a large extent But for this it is both necessary and possible to persuade our people and wean them away from the deadly habits Mere lip service will not do, education publicity and persuasion will be needed to bring about the derived change Anyhow this is the kind of approach that we need in our country today, and for the years to come


# Water Balance in Insects 

P N RAVINDRANATH

Insects are the only group of living organism which has got such an adaptability to the diversity of climatic conditions of agroeco systems Each and every part of it is adapted for its living which in turn avoids competition between and within species As the size of the insect is much smaller when compared to other arthropods therr surface area of the body exposed is more As pointed above there are certain insects which can even thrive well under desert conditions when the diurnal temperature may reach even upto $45^{\circ} \mathrm{C}$, which is enough to wipe out human population An insect namely chrysodothris sp can even thrive well at $53^{\circ} \mathrm{C}$ Really wonderful is it not?

Under the high remperature there is the risk of they being knocked out due to desiccation. See insect body is thin and fragile mostly though some insects possess hard cuticle So they are oft con fronted with the formidable task of conserving whatever moisture present in its body The desiccation results in the reduction in the volume of haemolymph and consequent increase in osmotic pressure Because of the presence of outermost wax layer on the epicuticle its permeability to water is meagre Though there is an effective barrier for the regulation ofwater loss water is lost from the body through various other means This involuntary loss is to be counteracted by the insect through varous other physiological means in miniature an interaction between the above two is called water balance or 'Osmoregulation in insects

## Loss of water

The first and principal way where through evaporation takes place is cuticle itself See, cuticle has an outer layer of wax which is an, aggregate of lipid molecules When the atmospheric temperature nses above the range the lipid molecules move apart giving a big space between them which in turn give foom for the leakage of water If we look the case
of eggs and pupae which are helpless in the sense immobile, water reserves are extremely small and are more resistant to desiccation But adults and larvae are comparatively less water proofed Loss of water from body mostly takes place through cuticle say upto $67 \%$ but due to excretion only $14 \%$ loss have been recorded it is also seen that when an unfed insect is exposed to dry condition in an en closed area the rate of transpiration was halved It is seen that state of hydration of insect influences spiracular opening it is also found out that spiracles of partially desiccated insects do not open in atmosphere containing less than $5 \%$ Carbondioxide

## Some Examples

A flying aphid namely Aphis fabal looses moisture of $1 \%$ of its body weight/hour by evaporation There is a phenomina existing is some insects known as Cryptobiosis This is the capacity of certain insects to withstand a state of suspended animation One Chirinomid viz Polypedilom in W Africa can survive in the desiccated condition for several years at a R H of $8 \%$ when they come in contact with moisture they become active again In this desiccated condition they can withstand temparature upto $-195^{\circ} \mathrm{C}$ for 3 days and at $102-$ $104^{\circ} \mathrm{C}$ for at least 1 mınute

Sometımes effect of desiccatisn is mechanical The chorion of the egg may become too hard for the insect to break through the shell The size of the wing and body of Lucilia is largely determined by the water content Sometimes rate of development is retarded by very high humidities The pupal stage of Lucilia is prolonged by about $5 \%$ The pupa of Bruchus obtectus takes 14 days for the emergence at $45 \%$ R H but when the air is completely saturated it takes 22days The duration of the pupal stage in Popilia increased as the water content reduced The eggs of collembola and grasshoppers remain dormant for years in the desiccated state At
$70 \%$ R H Ephestis required 33 days for the larval development and had a water content of $735 \%$ at $33 \% \mathrm{R} \mathrm{H}$ and at the same temperature it took 50 days and had a water content of $573 \%$

## Gain of water

To counteract the losses the gain of water in to the system can be achieved by any of the following methods

1) Water through consuming food
2) Absorption of water through cuticle

In one Collembolan Onychiurus ventral tube on the abdomen is concerned with the absorption of water in liquid form if desiccated Syrphid larvae is placed in contact with moisture larvae gain moisture of $50 \%$ of its body weight in few hours through rectal lobes
3) Reabsorption of water from faecal matter in the rectum

Water loss from the rectum can be mınımısed by discharging dry faecal pellets thereby absorbing water

## Replenıshment of Moısture

Normally most of the adults or larvae do not drınk water but take only nectar or honeydew it is seen that water ingestion of blow fly was controlled by taste receptors, on tarsı and labellum and that drinking is terminated by the adoption of these sensillae and internal factors Among the internal factors major hand goes to haemolymph volume and pressure in an experiment it was seen that corpus allatum extract caused an increase in water intake in honey bees and corpus cardiacum a decrease But when Corpus Cardiacum and Corpus allatum extracts both were applied it had no effect on water intake

Apart from injesting the water integument also play an important role in the absorption of water This kind of absorption is particularly noticeable during embryonic conditions Eggs of some species can even imbibe water twice its body weight

This kind of absorption is mainly controlled by specialized regions on the surface of shell and are dependent on aerobic respiration which varies with metabolic activity In some insects absorption of water vapour is also reported There are certan insects which can absorb water vapour even from unsaturated atmosphere and vice versa

## Control of Excretion

As stated formerly this is effected by the reabsorption of water from the faecal matter and driving out the faecal matter in the form of dry pellets This is due to the very low pH in the honey comb border of each Malpıghıan tubules where all salts get concentrated by the reabsorp tion of water This activity is also reported to be due to hormonal regulation At high humidity water content of faeces is about $72 \%$ but in dry air It is only $33 \%$ The water content of insect body is regulated directly by relative humidity of the air and not by the water contents of its body This type of osmoregulation is the most efficient and important method which most of the spicies own

Insects living in fresh water keep their water balance by excretion from rectum as much fluid that enters the animal through the body surface owing to the osmotic gradient and through the gut as a result of drinking Whereas insects living in salt water and land on the other hand water loss occurs not only by discharge from rectum but also by osmotic withdrawal or by transpiration through body surface

> "Agriculture starts moving only when a package of economically viable technology is supported by appropriate packages of service and of publıc policiesIf we do not improve crop yıelds, ours will be one of the most inefficient agricultural systems in the world by the 1980 s "

-Dr M S SWAMINATHAN

# Role of Agriculture in Economic Development 

P RAJENDRAN:

Agriculture is the man stay of living for the majority of population in the underdeveloped countries In India more than $70 \%$ of the popula ton depends upon agriculture for their livelihood and about half of the national product is of agricul tural origin An increase in the agricultural sector through enhanced production will therefore have the maximum impact on the overall national income If national income is an index of economic development agriculture is the sector that should claim prome attention

Although the largest section of the population is engaged on agriculture the production of food is hardly adequate The per capita consumption of food is far less than the minımum nutritional requirement Further the population grows at a rapid rate Again in a country with low nutritional standards a rise in per capita income is likely to increase the demand for food and for diversified food

Inflation is an ever present dangar in the process of economic development The seriousness of the danger would depend on the gestation period of the development projects and the magnitudes of outlay on them If domestic food production does not increase adequately the gap will be filled up by imports Foreign exchange is more urgently required for import of capital equipment necessary for economic development which in turn divert for food imports is hardly economic

Agriculture supplies at least partly the raw materials for domestic industry Expansion of domestic industry increases the demand for raw
materials calling for a corresponding increase in agricultural production Economic development is usually seen to reduce the ratio of agricultural to non agricultural labour force Barring the possibility of imports this would mean that productivity in the agricultural sector should rise faster than consumption per head of the agricultural population making avalable a surplus of food for the growing industial population

Agriculture must not only feed the domestic population and industry but also generate exports for the earning of foreign exchange

Thus in the initial stages of economic development the agricultural sector has to respond to valid demands-demand for more food for domestic consumption demand for more raw materials for domestic industry and demand for maximum contribution to export earnings If agriculture falls to fulfil these demands it would mean serious consequences for the economy in the shape of inflation and attendant hardships or a strain on the balance of payments or a slowing down in the rate of industrial development or a combination of all three

## Little Statistics

The overall Indian Investment in Agriculture during the period from 1950 uptill 1972 is roughly over Rs 5000 crores while the U S A aid to this sector would be between Rs $1250-1300$ crores Ald by Soviet Union is Rs $\mathbf{5 0}$ crores and by United Nations and others about 750 crores and Rs 1000 crores respectively

# The Kerala State Co-operative Bank Limited 

O. Overbridge Jn., Trivandrum

# A SCHEDULED BANK WHICH GIVES HIGHER RATES OF INTEREST ON DEPOSITS THAN ANY OTHER SCHEDULED BANK IN THE STATE. 

We accept deposits under a variety * of attractive schemes and provide all banking facilities

* We provide most modern Safe Deposit löcker facilities at our Head Office and Ernakulam Branch on moderate rental


## $\%$ *

We extend production and development credit to agriculturists, rural artisans, small scale and cottage industries etc etc and help the economic progress of the State through 11 affillated District Co-operative Banks, their 183 branches and a network of 1657 Service Co-operatıve Banks

## Deposits with the Bank upto Rs. 20,000/- are Covered under the Deposit Insurance Scheme.

# Isotopes in Entomological Research 

GEORGE KOSHY

Isotopes are atomic species of the same atomic number but having different Neutron numbers Radio isotopes and radiations are important tools in Ento mological research

The use of atomic energy in Entomological research dates back to 1931 when Campbell and Luckens investigated the permeability of gut wall of silk worm with lead But the real credit for the use of nuclear technology in biology goes to Hevesy (1920) who studied the distribution and metabolism of lead bismath and thorium Today with the avallability of many isotopes they are being increa singly used in many research programmes

## Isotopes in insect toxicology

The interaction between insect and insecticides can be studied with better accuracy using radıo tracer techniques Chromatographic methods com bined with radiometric analysis provide methods of characterising labelled metabolites and detecting metabolic pathways Metabolic fate of insecticides can be studied rapidly Radıoactive Isotopes have also been used in various physiological and bio chemical studies

Investigations on absorption translocation and penetration of insecticides both in plants and insects have been studied using labelled insecticides Radio autography is also profitably used in supplementing the information obtained by radıo metric assay Val uable information on the metabolism of chemosterı tents in insects has also been obtained with the help of labelled compounds

The persistence of insecticide can be accuratly measured by using labelled insecticides The levels of insecticide residues from time of apphcation through harvest storage washing and milling to time of consumption can be determind quantita tively with better ease and accuracy

## Isotopes for Labelling the insects

Labelling implies the association of an identifiable mark on an insect It is also called as radio tracer tagging It is an efficient technique in marking and rapidly identifying large number of insects The labelling techniques are used to study the dispersal
pattern behaviour and biology of insects it is also successfully used for tracing the dispersal of under ground insects Investigations can also be made on the transmission of plant and anımal virus by their vectors Studies on insect nutrition and develop ment are also made using various isotopes

The inter relationship between parasites and their hosts have been investigated with radio isotopes Information on flight range dispersal pattern capacity to locate and parasitise the pests can be obtained with different isotopes

## studies on food intake

It is demonstrated through the use of isotopes that aphid colonies which are attended by ants excret twice as much honeydew as compared to unattended colonies Isotopes are also used to show that drone honeybees are fed by workerbees The food transfer mechanism in honeybees is also studied using these techniques

## Use of ionising radiation

Radiation kills pests and micro organisms in food and extends the shelf life of perishable com modities Studies on the control of insects by radiation have been conducted by using ${ }^{60} \mathrm{Co} \&{ }^{137} \mathrm{Cs}$ sources The success achieved by E F Knipling in erradı cating the screw worm fly from the island of curacao is a classical example in the success of sterile male technique in pest control work

It is evident from the above that nuclear techniques are valuable in several areas of Entomological research They provide not only better detection methodology but can also be used to determine the efficiency of available analytical techniques and extraction procedures The use of nuclear techniques has developed to a great extent in advanceed countries and even in India major research institutions have established modern labor atories with sophistisated equipments K A U has also taken steps to establish an istope laboratory and it is hoped that our students will be able to do research with isotopes and radiations in the very near future

With best compliments of :

## The Swadeshi Chemicals Pvt. Ltd.

manufacturers and exporters of Aluminium Phosphide formslations
also manufacturers of other industrial chemicals like Potassium Permanganate, Manganese Sulphate etc.

MAHALAXMI CHAMBERS, 6th FLOOR, 22 BHULABHAI DESAI ROAD, BOMBAY-400 026

Tel 363392383392
Telex 0113761
Gram PHOSFUME BOMBAY

# Potato in Meghalaya 

JOHN K DURONG

Potato is one of the major crops of Meghalaya, occupying an area of about 18 thousand hectares out of the total cropped area of about 2 lakh hectares with the average yield of 45 tonnes/hectare and an annual production of about 74000 tonnes With the recent introduction of new high yielding varieties released from C P R I Sımla like Kufrı Jyotı Kufrı Naveen etc the average yield has increased to 78 tonnes/hectare This outstanding increase in yield is not only due to the fact that they are high yielding varieties but also because most of these new introduced varieties have high field resistance to late blight of potato one of the major diseases of potato in Meghalaya which causes havoc in the already established uptodate and Royal Kıdney varieties of potato With proper agricultural practices and correct dose of fertilizers and plant protection measures some of these varieties especially Kufrı Jyotı have performed exceedingly well yielding as high as 2530 tonnes hectare Our of the old introductions from England only one variety namely Great Scot is still farly free from the damages caused by late blight of potato but it is not very much preferred by the farmers since it contains too many deep set eyes whice reduce the market value of the tuber Kufri Jyotı on the other hand besides being late blight field resistant and high yielding has also the smooth skın property of uptodate or Royal Kıaney and generally produces large sized tubers it is no wonder then that these new varieties are fast replac ing the old ones in most of the farmers fields

The bulk of the crop is grown in the high altitude regions from about 3000 to 5000 ft above MSL where it is cultivated 3 tımes a year ie as a spring crop a summer crop and a winter crop in the lower elevations it is mostly grown as a winter crop or as an early spring crop when the temperature is farrly low

The methods of cultivation of these three crops are also different

## 1) spring crop

The spring crop is mainly grown in the paddy fields after paddy The crop is planted in Nov Dec and harvested in March/April and may be continued up to May The paddy field is ploughed holes are made 23 ft apart cowding and fertilizers are applied mixed with the soll and seed tubers are planted No irrigation is generally given since the paddy field is more or less sufficiently moist throughout the life cycle of the crop Weeding cum earthing up is given about 2 months after planting when top dressing of fertilizers is also done The harvesting of the crop actually serves as the first ploughing of the paddy field for the next crop of paddy and leaves behind plenty of organic matter replenishing the soil

## 2) Summer crop

This crop is not grown in flat land as the spring crop but the seeds are planted in rased beds locally known as BUN The BUN is made by piling up some grasses small bushes or twigs etc and covering them with a thin layer of soll sliced from around the pile itself raising the bed to about 23 ft The beds are usually 6 to 10 ft long and 34 ft wide These beds are made along and not across the slopes The grass underneath the beds is burned When the smoke stops coming out of the bed and the soll gets cooled the seed tubers are planted $1 \frac{1}{2} 2 \mathrm{ft}$ apart The after care operation are similar to that of spring potato

The advantages of having these ralsed beds for the summer crop are
(1) They facilitate the draining off of excess rain water through the furrows between the beds which are generally spaced 23 ft apart Since this crop is planted in Feb/March it grows throughout the monsoon months when the rainfall is the heaviest and is harvested in July/August
(II) The grasses etc underneath the beds are burned with slow fire Actually no fire flames out but only the smoke is emitted The smoke conti nues to come out for 5-6 days until all the collected matters are consumed by the heat of the flameless fire This system apart from supplying the crop with plenty of ash which is very essential to potato also gives the soil a sort of heat treatment which kills all the soil borne diseases and pests May be this explains why we do not have Golden nematode yet in Meghalava a pest which threatens the potato crop in the Nilgiri Hills
(iii) Since the soil in the slopes is generally shallow the raised beds provide ample frable soil for the roots and tubers to develop properly
(iv) The bed being only 34 ft wide all the aftercare operations $i e$ weeding top dressing of fertilizers earthing up plant protection measures etc can be operated easily from both sides without the need to go between the plants and trampling the crop In fact there is no space between the plants since the spacing is only $1 \frac{1}{2}$ to 2 ft from seed to seed
(v) Last but not the least is that because the beds are made along and not across the slopes they do not obstruct the rain water and cause erosion To check soll erosion more effectively the lower bed in the slope is placed against the furrow of the two upper beds and to reduce the quantity of rain water passing through the furrow the size of the furrow is kept at a mınımum

## 3 Winter Crop

Raised beds are made similar to that of summer crop But here the vegetative matters collected are
not burned but kept as such to decay The idea behind this operation is that since winter potato is planted during the rain in August/September the un-burned green vegetative matters below the soll layer help to drain off the excess rain water from the surface and thus prevent seed decay Again since urea is used as one of the constituents of basal fertilizers it quickens the docomposition of the green matters which then become organic manure The basal fertilizers are applied directly on the green matters collected then a thin layer of soll is given to cover them and then the seeds are planted After care of the crop is similar to that of the summer crop and is then harvested in Dec/Jan The important advantages of this crop are -

1) Fresh young seed supply is made avalable for the coming summer crop (the old seeds of last season s crop are already wrinkled by the tume they are planted)
iI) Most of the winter tubers are small in size which is a very important property for the seed potato since only 500 kg of small seeded potato ( $\begin{array}{llll}\frac{1}{2} & \frac{3}{4} & \text { dia) are required per }\end{array}$ acre while the seed requiremnt for large sized tubers (2 ) is about $8001000 \mathrm{~kg} /$ acre Farmers therefore prefer small sized tubers for seed purpose

Meghalaya supplies potato seeds to almost all the north eastern regions through government or other agencies These seeds are usually collected from registered growers who are given all facilities to produce disease and pest free crop This seed sale along with the marketing of potato for table purpose to near and far states bring home a sizable income to Meghalayan farmers

> "At the head of all sciences and arts, At the head of civilization and progress, stand not militarism, the scrence that kills, Not commerce, the art that accumulates, But agriculture, the mother of all industries, and the mamtainer of human life.

# Agricultural planning-A new Approach 

R PRAKASH

India a predominantly agricultural country with nearly three fourth of the working population engaged in agricultural operations is still depending year after year on import of foodgrains at a crippling cost to our economic and political well being just for main taining a below subsistence level of nutrition in the words ot Reston Nations talk about what they lack America talks about peace Germany talks about unity France about glory Russia about freedom and India about food Thus the achievement of self sufficincy in food both by bringing in more areas under the plough and by increasing producti vity rightly become the primary objective of our agricultural development To achieve increased productivity of the available land establishing a net work of extension agencies all over India to take the available agricultural technology to the doors of the farmers is necessary.

India is a poineer among the developing coun tries in planning for social and economic develop ment Agriculture along with irrigation and infra structure have received priority in almost all the plans we had though shifts in emphasis as between agriculture and other sections of the economy in the overall sche me of development was made The experience of planning in the field of agriculture during the last twentyfive years suggests some important and essential organisational and directional changes in the planning process and a reorientation in the outlook of planning machinery at different levels

Agricultural potential is dependent on soil rainfall temperature and irrigation facilities that are available or can be made available It is possible to divide the country into homogeneous regions from the point of view of this attribute For a large com-
plement of agricultural programmes the unit of planning will be an agroclimatic region

There are certain essential characteristics of agriculture which make it necessary to plan some aspects from lower levels eg village block and district However an effective unit for drawing up an integrated plan and budget for agricultural development will be the Ditstrict Different programmes in the field of land development irrigation input supplies crop production development of animal husbandry fisheries and forestry can be brought together into a single plan at this level It is also at this level that the coordinate and intersectional plans should be effected

The Indian village with its compact organisation of agricultural production anımal husbandry and village industry has always been the basic unit of national economy Agriculture being an individual enterprise, should participate the village community in any effort of planning for agricultural development The concept of whole village development needs to be tried on a pilot basis A plan based on an area approach taking a village as the basic unit and developing it into a large area should be tried

There should be closer coordination and understanding on methodology approach and basic assumptions for formulation of plan proposals among varıous working groups at the Centre and in the States There should also be a greater involvement of representatives having field experience from officials as well as non officials (eg agricultural economists scientists and progressive farmers) in these working groups The procedure for formulation and administrative approval of centrally sponsored schemes need to be simplified Plan scheme should be drawn in sufficient detals so that they
could be taken up as soon as the plan is approved for implementation by concerned authorities

A carefull assessment of the production potential has to be made in respect of different agro climatic regions The conditions in different regions have to be carefully analysed for improvement of biologi cal productivity The yardsticks should be fixed separately for relatively homogenous group of farms and for different crops These should be reviewed
at the end of each plan period to take account of technological changes that occurred during the plan period

Agricultural planning has to be a comphrehen sive effort starting with an assessment of the potential for production drawing up of development programmes to tap the potential and creatins necessary infra structure to ensure the avalability of inputs credit and marketing facilities needed by farmers to translate these programmers into practice
"The farmer is the father of the world But it is his greatness that he is not aware of the fact....'

## WITH COMPLIMENTS FROM



## ALLIED PUBLISHERS PRIVATE LIMITED

150-B/6 Mount Road, Madras 600002.

## To Masks all over

ASHA D VARMA

Off Off from the masks
Ah how much I love this moment of sheer bliss Away from the faces of false smiles and vanities
Away from the clouds of black factory smokes
Away from the whole machine work of this world
Off Off....from the madding crowds
How much I wished for this moment of sheer bliss
Oh' Man! Thou forget to live
Thou forget to enjoy the sheer joys of life
All thy sorrows are thy creatıons
The creations of thy false, false masks
Away from the maddening world of masks
It is just a sweet serene bliss
The world seems such a beautiful place
Pity, Pity oh heartfelt pity to masks
Masks Masks all the world over
For the mirash of bliss for which you search
Search and search...in an endless game,
When that is all within you yourself

## State Bank comes to Class Rooms

CERTAINLY, WE'RE NOT KIDDING I
WE'RE GROWING YOUNG II
OF COURSE, WE COME NOT TO TEACH OR PREACH but to serve you.

DEAR YOUNG FRIENDS,
PLEASE BE AT YOUR DESKS
WITH YOUR LITTLE SAVINGS,
WERE COMING TO YOU SHORTLY

You're going to save for furture with

## STATE BANK OF TRAVANCORE

THE PREMIER BANK IN KERALA

NOW IN THE SERVICE OF THE YOUNG ONES

## A Silly Little Conversation?

SHIRLEY A BABY

You have to flirt to get married Nice girls are left out of things There was pindrop silence in the room for a moment The remark was met with a violent reaction Miss Xs was the longest and the best

Ask the boys You II find out whether they want something new or something secondhandiThey like to have their fun but when they decide to get married they want a girl who is pure

One of the girls interrupted I think it s disgusting They have the right to have fun but we don $t$ Miss $X$ replied First of all from the moral viewpoint they don thave any more right than the girls But even if they do mess around that $s$ no reason for us to do the same thing To say He does it so why should nt I just doesn $t$ makesense Ofcourse they have a lot of advantages but we gırls are not completely helpless We re intuitive enough so that we can immediately grasp the intentions of others without having to resort to a long process of reasoning and we don $t$ need someone to draw a picture for us to understand what a boy is after By
reacting sensibly at the beginning it s best for both If we hesitate it s aften too late

Once You ve made up your mind to be pure it s farly easy to follow through The trouble comes when you play it half and half and try to lead them on a bit That s playing with fire and you re bound to get burned And remember that if you let them take liberties with you they may say they think you re great but deep down they have no respect for you If you keep to your principles they may complain youre old fashoned or that you re actıng like a saint but deep down they actually admire you

One of the girls said you have to flirt to get to know boys Miss $X$ answered what do you find out about a boy from flirting with him? The way he kisses? If you have any experıence at all you must know that nothing could be sillier than the conver sation of two people who are flirting They have only one concern to give the best outward impres sion they can They think that this is the best way to get what they want

## "Farming is not really a business, it is an occupatıon"

—W E WOODWARD

# SHAW WALLACE AND COMPANY LMMTED 

7. LINGHI CHETTY STREET, MADRAS-600001

"A COMPLETE AGRICULTURAL SERVICE"


STAR BRAND FERTILISERS SEEDS, AGRO CHEMICALS, PLANT PROTECTION EQUIPMENT, CATTLE AND

## My Dream

## P MAHENDRAN

My heart is full of dreams Moving like a boat in a stream Living in dream is sweet Thinking my life in height Nobody can part this sight Presuming my path is bright

My Dreams are undarkened But they are unlightened In a cloudy atmosphere Constructed like a spidernet Contınuing like a mirage

My Dream starts from my soul
My Dream termınates at Love Even my Love may end But my Dream will continue If I close my eyes for a while A dream is coming from my mind My Dreams have no death like my soul

I am living in my dreams In a corner of my dark mind Feeling loneliness in my thought Having Love in my heart

I am the king in my Dream
I can get love from any body
I can achleve my goals
A small seed can be made
Into a big banıyan tree
In my Dream magic
Though my dream is a mirage
It shows my image
In an unbroken mirror
Without showing an error
So that I live without terror
My Dream will change
According to my age
But it will have pages
In my all walks of Life
My Dreams are flying
In the air fast
Without wasting a time
Travelling faster Deeper
Even up to infinitive
No body can reach it
No body can catch it
Even I cannot catch
My flying Dreams
My Dreams
Please stop for a minute
I want to reach you

A small seed can be made Into a big baniyan tree In my Dream magıc

Though my dream is a mirage It shows my image an unbroken mirror Without showing an error So that I live without terror

My Dream will change
According to my age
But it will have pages
In my all walks of Life
My Dreams are flyıng
In the air fast
Without wasting a time
Travelling faster Deeper
Even up to infinitive
No body can reach it
No body can catch it
Even I cannot catch
My flyıng Dreams
My Dreams
Please stop for a mınute
I want to reach you

## Travancore Chemical \& Manufacturing Co. Ltd.,

Registered Office. KALAMASSERY, ALWAYE
Factories at

KALAMASSERY
Alwaye 4

KUNDARA
Kerala State

KONUR
Mettur Dam R S
Do you know, it is 'TCM' Brand Chemicals that lead the field?

## For your requirements of

Copper Sulphate Technical
Copper Oxychloride 50\% Spray (Fytolan)
Copper Oxychloride 4\% Dusts (Perecloud)
Oıl Based Copper Fungicide (Oleocop)
Sodium Aluminate, Potassium Chlorate, Barium Salts, Sodium Chlorate
Please contact our Selling Agents
Messrs. IMKEMEX (INDIA) LTD.,
POST BOX NO 2034
Madras-600 001.

Also write direct to our factorres at
ALWAYE - for the above and also for SULPHATE OF ALUMINA (Ferric and Iron free)
KUNDARA - for CHLORATE OF POTASH
METTUR DAM - for BARIUM CHLORIDE, BARIUM CARBONATE and SODIUM SULPHIDE

# Well, come Death 

S RAJEENA

It was around 6 pm when I turned on the radı This is All India Radıo The news read by Harish Kıshan The Aır India Boeing which took off at 10 A M today crashed shortly after take off and plunged into the sea There were 220 passen gers and 13 members of the crew in it The Kerala Minister for was one among the passengers Intense search is going on in the sea for any survivor

Vow I It was a great news especially so because the next day was a working day and the chances are that the minister who was in the plane may not survive That means a holiday a postpone ment of the quizes fixed on that day Thanks to you minister if only you are dead

The next morning there was an astonishing demand for the newspapers It read-

No traces of any survivors Fourteen bodies recovered-rot yet Identified Government seaks the co operation and assistance of the relatives of the unlucky passengers in the search campaign And in a separate column was this bit of exciting news HOLIDAY FOR ALL EDUCATIONAL INSTITUTIONS IN KERALA That was all what was needed One group went to the city-to SIMLA to have a treat given by Miss
who got merit scholarship Another group went to a friend s house to have a nice lunch A third party had enough time to prepare assignments to study for the next quizes and to have a nice doze in the afternoon Anyway nobody should misunderstand There was a blackflag on the flag post

So this was the death of a minister Of course there may be some who would cry for him but that too will be for the party s beloved leader not for himself Then and there I decided never to become a minister not even the dear heart of a minister

$$
\begin{array}{llllll}
\mathbf{x} & \mathbf{x} & \mathbf{x} & \mathbf{x} & \mathbf{x} & \mathbf{x}
\end{array}
$$

I was studying for my II B Sc (Ag) I had a sudden illness-nothing serious But before anybody realized what was happening it turned out to be serious and I was declared dead in the Medical Mission Hospital Pandalam (I don tremember the
exact date but Im sure it was a Monday) The Nurse simply threw my card and said No 18 over Her voice was as emotional as it would have been when throwing away a snall which had silently crept into her bedroom So I simply lay these dead I was taken home and everybody-my father mother sisters-all were crying I felt very sad

Hal, there comes my beloved bus - College of Agriculture written in front of it Some teachers and many of my classmates came out There was our class representative with a beautiful wreath in his hands I looked at the girls Almost all had their eyes full They may be thinking of the Condolence meeting held in the college-most probably in the Mandapam I am sure now that I m dead many of the girls and boys might have prased my talents though I ve none stated that I studied well was obedient and alas I can hear somebody saying -she had such a good conduct and character that other girls should try to imitate (If only I could laugh) Then men are always like that When you are alive, they will threaten you that they will kill you when you are dead they II say with tears in their eyes and their body shaking with emotionI m not yet really free from the shock that this death has imparted on me

And now, even through the tears of the girls I could see their happiness at having got a holiday Then this is not the death I should have I don t want to make anyone happy with my death lest I should waste all the money that had been spent on me for the last 18 years

$$
\mathbf{x} \quad \mathbf{x} \quad x \quad x \quad x
$$

Then the problem of when to die remains as an unanswered question. When shall I de ? Will it be okay if I die as a JAO? Then there will be very little mourning and crying Only the people whom I love and who love me will come to mourn over my death No wreath no black flags, no black preces of cloth on saris and shirts. All these artificial mourning will make a man/woman yearn to come out of his grave and slap them

So it is fixed eh? But death be considerate I don tong to die I only suggested, you know .

# Partners in Progress and <br> Development of Agriculture in Kerala 

## Kerala Co-operative Central Land Mortgage Bank Limited Trivandrum

Through Primary Co-operative Land Mortgage Banks Loan is provided for all kınds of Long Term Investments in Agricultural Development Activities

## Specral Development Loan

* For cultivating important crops like coconut rubber coffee, cardamom etc
* For providing irrigation facilities
* For digging wells and installing pumpsets
* For purchasing tractors and powertillers
* For all kinds of land development activities

For further detalls please contact our Regional Offices AT TRIVANDRUM, QUILON, KOTTAYAM, ERNAKULAM, PERINTHALMANNA, CALICUT AND CANNANORE

## Improvement in Agriculture will Stabilise the Deonomy

## Our financial position as on 30-6-1978

1) Paid up share capital
(Rs in lakhs)
2) Total loans outstanding 19978
3) Debentures in circulation
321068
4) Reserves \& other funds
3707.15
, Reserves \& 11238

## A Silent Despair

## S. SOBHANA

A long dreary day I ve passed Without glimpsing thy face once But it haunted me all the time To leave a mist of sadness in me

And now that darkness has come I feel lonelier still and sadder Though no I it isn t sadness I feel it s only a longing for a heart s desire

Sleep neglects me though nothing hinders me Save my thoughts of you you alone And they evoke something deeper in me To mist my eyes and cloud my brow

A silent tear, rolled down my cheek And fell onto my coal black sweater Crystal like it settled there-
Its shining daring even a diamond!
And then memory of thy smiling face Lit a glow in my heart to shine in my eyes, And my lips moved to answer your smile And I felt my sadness dispelled

He came at midnight the Prince of Sleep, He smiled at me a calm serene smile And bid me enter his blessed domann I obeyed, a smile still caressing my lips

# - 8円MCD <br>  <br>  

#  

## 




## 1101030

Bn010 65 630/65193


มา


# Pulses_The Poor Man's meat 

K SIVAN PILLAI

The leguminosae is an extensive family including more than 13000 species Out of these some 20 species are eaten by man in appreciable quantities Legumes occupy an important position in balancing the diet of the people since the grains have a high protein content varying from 17 to $25 \%$ Dry legumes are hence called the poor mans meat Legumes supply excellent forage and grain concentrates in the feed of the large cattle population They are also used as excellent green manure crops adding much needed rich humus and nitrogen to the soil

India grows a variety of pulse crops which probably no country grows in the world but the unfortunate situation is that with the large acreage of about 2426 million hectares the pulses production is only about 1213 million tonnes which is equivalent to a percapita production of 3040 gms If the nutritional level on the basis of pulse protein is to be raised to 104 grams per capita as prescribed by the FAO and WHO nutritional standards, the pulses production levels are to be rased to about $70-75$ million tonnes Due to the low production two third to one half of Indias population suffers from varying degrees of protein malnutrition

Cowpea, black gram green gram red gram and horsegram are the important pulse crops grown in Kerala covering a total area of about 36529 hectares producing about 16270 tonnes of pulses Although the area under pulse crops has increased recently the decrease in production in the last few years is a great concern With stagnant production and increase in the population the problem of adequate supply of pulsegrains for balancing the diet of the people is becoming more and more aggravated Hence improving the yield potential of these crops is an urgent need to help the large section of the population belonging to the middle and working classes For economic geographical and technical reasons the diet of a large section of the population will be lacking in these foods for many decades

Since grain legumes are indıspensable for supplementing the protein content of diets based on cereals and starchy roots greater consumption of it can be brought about only by increasing produc tion All programmes to increase supplies of legumes
must depend on achieving larger yields since exist ing yields are very poor This calls for adequate research to discover the species and varieties which give the greatest yields under different climatic conditions

The Kerala Agricultural University is giving much emphasis for the development of improved varieties of pulses and for extending the area utilizing the rice fallows

Moreover it is a matter of great concern that the pulse crops have been pushed to marginal solls with no irrigation facility The main problems of these crops are -

1 Low yield potential and unstability in yield
2 Inadequate collection of genetic resources
3 Lack of adequate Research on adaptability bre eding agronomy entomology pathology grain quality consumer acceptance and cooking quality

These crops still need massive injection of technological inputs to give quantum jumps in production per unit area and per unit time

In Kerala the pulse crops are mostly cultivated as intercrop or mixed crop and as bordercrop The area can be extended easily by utilizing the rice fallows These crops can be cultivated in rotation in most of the areas and will help to keep the soil alive and productive The pulse crops particularly redgram has such a plasticity that even in drought years when other crops fall it is capable of producing some yield

It may be hoped that with the research activities initiated by the Kerala Agricultural University and enhancement of such Programmes in future will contribute to the genetic improvement of these crops In addition the great role undertaken by the extension personnels in increasing the area under. these crops by educating the cultivators on the multifarious uses of pulses will certainly augment production to the maximum extent

## Protect the Crops with

## "Hexamar" Plant Protertion Products

## INSECTICIDES

PHENDAL 50 E C (Phenthoate)
PHENDAL 2 \% Dust
HEXASULFAN 35 E C (Endosulfan)
PARAMAR M 50EC (Methyl Perathon)
HEXAVIN 50\% W P (Carbaryl)
HEXAFURAN 3 G (Carbofuran)
HEXAGOR 30 E C (Dimethoate)
SURKIL 5\% G (Thodemeton)
HEXAKEL 185 EC (Dicofol)
MARVEX SUPER (D D V P)
MALAMAR 50E C (Malathon)
PHOSALONE $35 \%$ E C
MONOCROTOPHOS 40
PHORATE $10{ }^{\circ}{ }_{0} \mathrm{G}$
ETHION 50 E C

## FUNGICIDES

H Phos 50 E C (Ediphenphos)
CUPRAMAR (C O C)
HEXATHANE 75\% WP (Zineb)
HEXATHIR 75\% WP (Thiram)
VITAVAX 75\% WP (Carboxin)
NICKEL CHLORIDE
WEEDICIDES
2-4 D $80 \%$ S S
NITROFEN 25 E C
KARMEX (Diuron)
HEXANIL (Propanil)
HEXAPON (Dalapon)

For detalla contact

# Bharad Puverising Mills (Pi.) Linitex. 

 BORBAYMADRES

Kerala Branch Sastrı Road,
KOTTAYAM-1
Tel No 2836

## You Can

## SVERUP JOHN

Perhaps you may be poor in games and sports may be very poor in studies not at all acquainted with arts

But you can be first in games and sports attan top in studies become a genuine artist achieve anything you like

This is not a magic 1 am revealing
but the utmost reality of life
who told you you are incapable of certain things?
It is you who told yourself incapable
you chained yourself in the post of inabilities
you consoled your mind I am good for nothing
Dear friend you are entirely wrong
you are a man with wonderful abilities you are the superb creation of this world you have that part of power-that controls the universe

First of all please go into yourself through meditation
I mean thorough analysis of yourself
Remove all the rubbish matters covering your soul
Atlast you can feel yourself-your soul
you can sense the amazing potentialities of yourself Then put forward the objectives aims ambitions as you like
depending on the needs situations
Create confidence in yourself
And work hard continuously
specifically with determination
in that path
-Dear friend-
You will be first in that game of life
Please take these clues know yourself have confidence work hard
-You will win
YES YOU CAN

## With

## best complliments

from:


## E. K. Arumughom Pillai

General Merchants

## Chalai, Trivandrum

# The Insect Host-Plant Selection 

s DEVANESAN

The host plant of a phytophagous insect is the universe in which it finds nourishment and shelter The set of plants with which an insect species is tropically associated is called its host plant range Species that are broadly adopted to fit succesfully into a variety of habitats or eat a variety of foods are known as eurytopic (generalists) when refering to their food habits

Based on the taxonomic relationship of the hostplant range insects may be classified as (i) Monophagous (iI) Oligophagous and (iII) Polyphagous If their host ranges include plants of one or a few closely related species within a genus several genera within a family or several families in various orders of plants respectively

## A Evolution of Insect-Plant Interactions

It seems that phytophagous insects were originally polyphagous They ate indiscriminately a wide variety of plants available in their pristine habitats Some primitive plants evolved to produce and concentrate certain secondary metabolites which had an adverse effect on the insects feeding on them Insects avoided feeding on these plants However certain biotypes evolved which were able to bypass the barrier created by the odd compounds in the plants The plants thus become acceptable food for these insects The biotypes had exclusivity in the utitization of the new food plants then gaining an evident advantage over the competitors In time these odd compounds become feeding excitants or stimulants There are instances where a chemical defence of plant against insect became the determinant of a more intimate association between insect and plant One of the striking examples of such a development is offered by the Klamath weed and other plants of the genus Hypericum These plants secrete a compound-hypericin- which causes photosensitivity and skin irritations sometimes leading to blindness and starvation in animals that eat
them Klamath weed is avoided by most herbivores but the beetle Chrysoxina brunsvicensis uses the hypericin secretion as an attractant to locate its food.

This continuous process of development of new biochemical barriers by plants and adaptations by insects had a profound influence on the direction of the evolution of insects and plants The mutually influenced evolutionary process exemplified by the relationships of butterflies and their host plants has been termed coevolution by Ehrlich and Raven The chemicals involved in this process are called allelo chemics and they play a central role in host plant resistance

## B Behavioral and Physiological Components of Insect Plant Interactions

The host selection process in phytophagous insect is a chain of events (plant stimuli insect response in which each link facilitates the unfolding of the next The five major steps involved in this are (1) Host habitat finding (2) Host finding (3) Host recognition (4) Host acceptance and
(5) Host suitability

## Host Habitat Finding:

Dispersing adult populations generally arrive at the general habitat of the host by mechanisms that involve phototaxis anemotaxis geotaxis and probably temparature and humıdity preferenda Quite often agricultural pests stay in the general area where crops are planted and this phase become less important in host selections

## Host Finding :

Long range sensorial mechanisms probably visual and olfactory bring the insect into close contact with a plant Several aphid and whitefly specers tend to alight on yellow surfaces and larvae of certain beetles are attracted to vertical patterns When odours of the host plant are present grass
hoppers and the colorado potato butle Leptinotarsa decem/meata tend to fly upwind increasing the chances of locating the host

On contacting the host short-range tactie and olfactory sensonial inputs assist further movement causing the insect to remain on the plant Tarsal and antennal chemoreceptors in contact with a plant receive the stimuli that signal landing on the right host Host finding behaviour of aphids has been studied more than in any other phytophagous insect and closely follows the mechanisms described above (Kennedy and Fosbrooke 1973) After lending the aphids Rhopalosiphum incertus and Aphis pomi apparently perceive a flavonord (phtonicin) which typically occurs in leaves and other organs of apple trees the prefered host of the aphids

## Host Recognition

Although larvae are endowed with the sensorial equipment for certain levels of host recognition quite frequently this phase has been taken care of by the ovipositing female Certain grass hoppers are known to bite a plant before ovipositing Caterpillars receiving the proper stimuli testbite a plant This first bite causes other chemicals stored intracellul usiy in the plant to stimulate the gustatory receptors

## Host Acceptance.

Different chemicals apparently govern the various phases of the feeding process In the silk worm larvae Bombyx mori a series of compounds extracted from mulbery leaves was associated with initial biting swallowing and continuous feeding

## Host Suitability

The nutritional value of the plant and the absence of toxic compounds finally determine the
adequacy of the food to sustain the various phys ological process related to growth and developnei of the larvae and longevity and fecundity of th adults

## C Plant Components

## 1 Physical factors

Certain morphological characteristics of the hos plant such as sacculence toughness pilosity an pressence of thorns or spines are regarded a permissive factors whose pressence may act a barriers to normal feeding or oviposition

## 2 Chemical factors

The external environment surrounding the plant is dominated by compounds of the secondary metabolism which exude from the outer layers of tissues The compounds generate the olfactory stimuli that prevall in host finding and recognition The internal plant environment however is formed of a complex mixture of compounds some having nutritional value some that act as finding excitants or inhibitants some toxic and probably a large number of inert compounds in general primary metabolites and their polymers are nutrents that are converted into insegt body matter or utilized to produce energy Secondary metabolites quite often act as token stimuli and have of no nutritional value

Theories of host plant selection have either stressed the role of secondary metabolites or ascribed to nutrients as equally important role Stimuliderived from nutrients and odd compounds are intestained in complex sensorial inputs These inputs are decoded by the insect s central nervous system into an expression of host or non host which is the central link in the chain of events of the hostselection process

[^0]
## Death

## P J. sIVAKUMAR

Ah 1 Here she comes clad in white The Goddess of Death with an inviting smile At this early hour really a surprise to me

I could smell something very very odd
Might be the smell of Death that was So strange to me until Her arrival

Here she is near me saying dear Boy
Come on It s time for you to be in My kingdom-The Kingdom of Death

Is it I asked but can tyou spare me Some more time in this world , to which She replied No

Then I thought myself-is it time for me to go but no time to think much I could hear the death bell tolling

Good bye, Friends, See you in the Nether world

## macphos.ff (foliar fertiliser)

## Microfine wettable powder for direct and rapid assimilation

- Healthy, sturdy plant growth through proportionately balanced NKP ingredients
- Quicker assimulation of the mucrofine powder discourages weed growth
- Drasuc reduction un use of other chemucal ferthisers
- Ideal for plants attacked by muldewparticularly grapes \& tea
- Easlly sprayed by hand sprayer, power sprayer or powder dusters
E Effective on all crops - mcluding vegetables, plantations and rose gardens



# Musical Meanderings 

BIJIOU ALBIN

Shakespeares Twelfth Night begins with the words If music be the food of love play on The love lorn Orsino calls for an excess of it presumably to drown his love in it Listening to him one might very well exclaim whether music is the hobby only of the romantic Conversely are all the roma ntic guys that we meet with in life really music minded? We may treat King Richard III who pro posed to the widow of his own brother whom he murdered as romantic But it would be too much to believe that he had music in his heart if at all he had a heart Julus Caesar asks Mark Antony to beware of Cassius who hears no music Can we accept this as a universal dictum? Are we to be cautious about the Homo sapien who has no ear for music? In that case we may have to keep away from humanity Referring to the harmony in our immortal souls Lorenzo tells Jessica

The man that no music in himself
Nor is not mov d with concord of sweet sounds
Is fit for treasons stratagems and spoils
The motions of his spirit are dull as night
And his affections dark as Erebus What Lorenzo told Jessica is really incredible

Then what is music which like sleep is loved from pole to pole? Music is such a divine gift that Milton sings of Shakespeare as Sweetest Shakespeare Fancys child warbling his native wood-notes wild Tennyson refers to Milton as the God-gifted organ of England It is not correct to confine music as Lorenzo does, to immortal souls Did not Orphens charm both the animate and the inanimate with his celestial music? Does not the snake charmer enslave the most poisonous of snakes with his music? Does not the mother lull the child the most recalcitrant of all anımals to sleep? It is time that there are cynics who hold the view that the child does not really sleep but pretends to sleep of course with a philanthropic view to prevent the dear mamma from making the unearthly voice

Music is one of the oldest and most important of arts It is all around us The poet and the scholar the prince and the peasant the scientist and the artist the saint and the savant prase and covet it alike A simple definition of music is that it is the art of making pleasing combinations of sounds It is the artistic expressions of voices or instruments of melodic rhythmic or harmonic tones By music the Greeks meant all the nine arts as personified by the Muses A composer creates rusic by arranging sounds and rhythms in an intertsting way There are many kinds of music ranging from folk songs to operas from musical comedies to symphonies Melody is the most important ingredient of music But serious music in addition to being melodius is planned and artistic Then only can it be repeated and communicated effectively Music must convey an artistic significance it must show man reacts to life and finds a meaning in his experience

There are no hard and fast rules as to how to enjoy music The best way to enjoy music is to find the type that pleases us and to listen to it By listen ing we become familiar with the way the composer and performer use music to communicate with us After listening we way try to make some music of our own We may sing etther alone or with others. We can find pleasure in making music even if we do not want anybody to hear it

Intelligent listening is a sine qua non for the proper understanding and appreciation of music. When we listen to a familiar work of music we can anticipate what comes next with the same pleasure we find in reading again a favourite story or poem Even if the music is unfamiliar we can derive much pleasure from it as it brings forth unexpected melodies and harmonies it is this unexpected har mony that held the attention of Wordsworth as he listened to the song of the salitary reaper who sang in a language unintelligible to the poet We appre clate music because it communicates to us something that gives us satisfaction

Vocal music occupies an enviable position Human voice Is indeed a divine blessing The instrument is but an artifice invented by man to serve primarily as an accompanıment to the voice Origınally the instrument was invented to serve the human voice Thanks to the pernicious influence of modern cinema the position is reversed The instrument is the master and the voice its humble servant To many people both in our own country and abroad, Indian music has come to mean a third rate rendering of tunes set to pleasing and often meaningless words It is a pity that the beautiful classical music of our country the richest legacy that we have is relegated to the back ground The charm of Indian music is that it is so delicate that it eludes us unless we have exceptionally sharp ears and an instinctive affinity with this great art

Musical traditions in India go back to 1200 B C The ancient Indians believed that music was directly related to the fundamental processes of life Indian music is broadly classified as Hindusthanı and Carna tic, the former prevalent in the north and the latter flourishing in the south There are several subtle differences between the theories of these two schools Despite the diversity in the development of the ragas in the two schools of music there is a fundamental unity of background spirit and inspi ration in both because they owe their origin to the same sanskrit treatises on music

There are about twenty-two notes which form the basis of the different scales in Indian music The different combinations of these notes produce the ragas which number more than eight hundred Every human mood or emotion is necessary to make Indian music for that matter any music really beautiful

Of the Indian musical instruments, the Veena is the finest though the sitar is competing to oust it from its pedestal On a rough estimate there are twenty-six varieties of stringed instruments eighteen types of wind instruments and two hundred and eighteen different patterns of drums Violin sarod flute tabala mridanga etc are some of the popular musical instruments of India The harmonium though banished by the Akashvani is slowly returning to its pristine position of prominence today

Attending a music concert is really an exhile rating experience As we listen to the Indian classi cal music we feel as if we are carried into a world of fantasy where sound is the only substance and everything else its mere shadow Caught in the rapture of such an atmosphere we wish that we could even be in that world of melody Unfortunately the younger generation has somehow deve loped a derisive attitude towards classical music Perhaps this is a direct outcome of the deleterious impact of the west on immature eastern minds

There is something about singing which energises us physically illuminates us mentally and exhilerates us spiritually One wonders whether there is an intrinsic connection between our phychological problems and our failure to feed our souls with music Most of the tension in our life arises from our ina bility to relax Music helps us to relax It is hear tening to note that the therapeutical value of music is recognised gradually Perhaps the day is not distant when the forgetful child who cannot retain anything he reads the mother who has no milk to breastfeed her child the father who hugs the bottle to escape from domestic worries and the agriculturist who reacts his brain to increase the yield from the field turn to music, the panacea for all the ills evils and inequities of life

"When a man works for an ideal he becomes Irresistıb/e"

# My Dear Friend Guitar 

JOHN K DURONG

When I m so lonely feeling so blue How I long for a friend just to talk to The Place is quiet the mornings still far, Nobody to cheer me up though I search all Over

How my head aches I still remember Silently regretting for coming so far Tears start rolling when suddenly I hear The sweet vice of some one my old friend guitar

I take it in my arms gently lovingly Caressing the strings as fondly as can be Inturn it replies in tune so tender
Here is your friend Your sweet old guitar
The sweet voice of its strings consoling my heart Softly whispering Life s not so bad Don $t$ feel dejected don $t$ feel so blue In these sad moments I am always with you

No rose without thorns as some people say Though hopeful is the morn yet maynot be the day No smiles without tears no joy without sorrow Nothing to worry until tomorrow

Hearing there words heartaches disappear I am happy again my guitar dear!
But don t leave me alone don t let me cry, Be my best friend, tull the day I die

## With best compliments from

## bonasil Iuxss world Linite

Sales Office

# 23/24 Second Line Beach <br> MADRAS-600 001 

Telephone 23775 Grams BOROSIL

MANUFACTURERS OF CORNING(R) BRAND SCIENTIFIC
AND LABORATORY GLASSWARE

## From Seedlings to Harvesting

## It's RALLIS all the way

Contact for an your requirennemts of Fertibizers pesticices ano Tecnnicall Guidance:

## RALLIS INDIA LIMITED <br> CALICUT / COCHIN / PALGHAT

# Insectivorous Plants 

S G SREEKUMAR

You may be wondering when you come to know that there are plants which capture lower anımals particularly insects These plants digest the prey and absorb the nitrogenous products (Proteins) from their body So far about 450 species of insectivorous plants have beeen discovered representing 15 genera and 5 or 6 families and about 30 species occur in India

Insectivorous plants are maınly classified based on their Systimatic Position into Droseraceae Sarraceniaceae Cephalotaceae Lentibularraceae and Nepenthaceae Another classification based on their mode of capture of the prey is as follows

1) Plants with sensitive glandular hairs secreting a sweet glistenting viscid substance-eg Sundew
2) Plants with special sensitive hairs on the leaves-eg Venus fly trap
3) Plants with leaves modified into pitcherseg - Pitcher Plant
4) Plants with leaf segment modified into bladders-eg bladder wort

Some of the important insectivorous plants and their mode of catching the prey are described below

## 1 Sundew (Drosera)

Drosera is a small herb The common species found in India are Drosera peitata, D burmanni and $D$ indica Each leaf is covered on the upper surface with numerous glandular harrs known as tentacles Each gland secretes a viscous fluid which glitters in the Sur like dewdrops and hence the name Sundew The movement of the sensitive gland is initiated by the presence of nitrogenous substance The insect may alight on the leaf mistaking the glistening substance as honey Then it gets entan gled in the sticky fluid and meanwhile the tentacles bent down and cover the body of the insect from all sides and the insect is suffocated to death The
glands secrete an enzymure called pepsin hydro chloric acid which convert the proteins in the body in to soluble simple forms The digested products are absorbed by the leaf

## 2 Butter Wort (Pinguicula)

The only species recorded in India is Pinguicula alpina which is a small herb growing in the alpine Himalayas at an altıtude of 3000 to 4000 M The leaf surface is covered with sessile and stalked glands When any small insect alights on the leaf it gets trapphd by the sticky fluid and the margin of the leaf roll inwards and cover the insect body The sessile glands then secrete pepsin hydrochloric acid and digests the proteins present in the body of the insect The digested products are absorbed by the plant Studies have revealed that the seceretion of the enzyme was stimulated only by the presence of nitrogenous substances

## 3 Venus fly-trap (Dionaea muscipula)

This herbaceous plant is a native of US A Each half of the leaf blade is provided with 3 long pointed hars-trigger hairs-placed triangularly on the leaf surface The midrib acts as a hinge and a slight touch to any of the hairs brings about a sudden closure of the leaf blade The upper surface of the leaf is thickly covered with reddish digestive glands When any insect is trapped inside the leaf the enzyme is secreted and the prey is digested and absorbed

## 4 Water Fly-trap (Aldrovanda Vesiculosa)

This plant has a wider distribution over the earth and is found in the salt lakes of Sunderbans Salt marshes south of Calcutta and several tanks in Manipur It is a rootless free floating plant with whorls of leaves There are a number of sensitive hairs on either side of the midrib and the leaf is protected by some bristles The margin of the leaf
contains minute downward pointing teeth and numerous digestive glands on the upper surface of the leaf The mechanism of catching the prey is similar to that of dionaea

## 5 Pitcher plant (Nepenthes)

Nepenthes khasiana is the only species found in India They are climbing under shrubs or herbs which often climb by means of the tendrillar stalk of the leaf The pitcher is the modified leaf blade the tendrillar stalk is the modified petiole and the lami nated structure is the modified leaf base Each Pitcher varies from 10 to 20 cm in height When young the mouth of the pitcher remains closed by a lid which afterwards open and stands more or less errect The underside of the pitcher is covered with numerous sharp hairs pointing downwards Lower portion on the innerside of the pitcher is studded with nume rous large digestive glands The Pitcher is partially filled with a fluid Small unsects as they enter slip down and get drowned in the fluid The prey is digested and protein is converted into peptones
and then to amines and absorbed Carbohydrates and other materials remain undigested in the pitcher as waste products

## 6 Bladder wort (Utricularıa)

More than 20 species has been found in Indiaand the common one is $U$ flexuosa They are mostly herbs The leaves are very much segmented and some of these segments become transformed into bladders provided with a trap door entrance The trap door act as a valve which can be pushed open inwards but never from inside to outside When small animals enter in to the bladder the valve is shut off leaving no charice to escape The digestive glands present on the inner surface of the bladder secrete the digestive fluid and the prey is digested and absorbed

All the insectivorous plants mentioned above are green in colour and prepare their own carbona ceous food while they partially depends on insects for their nitrogenous food (protein) requirements

## With Best Compliments

from

# REECHEM PRIVATE LIMITED 

(Mfrs of Quality Laboratory Chemıcals)

## "TREECHEM FOIR IEELIABILITY"9

Regd Office
3-6-147/A, Himayatnagar
HYDERABAD - 500029 A P
Phone 32823
Grams CHEMAGE

## Sales Depot

6, Sullivans Garden Road,
Mylapore Madras-600 004
Phone 75677
Grams CHEMICALS

## Last Letter

V K GIRIJA

Dearest here I am with no link to your world And lots of things still untold The world around me spindles madly As I think of the life we could have had
Dearest don $t$ you remember those days
When we dreamt together hand in hand
The sweet dreams that could not stand the wave of time Which crumbled like a castle of sand
Like the colourful butterflies with sweet but short life time
Dearest don tyou still hear the luring music of love
That we have whistled thro the woods
The rhythm of which enchanted even the wild trees Who danced in tune with our hearts
And put us in a pleasant mood
The day still haunts my mind
When we lay bathed in the resplendent moon
And over the fiery red flower
That clothed the blissful lake quite nude
And shared our feelings from noon till moon
Where are those woods now?
And where gone the blood red flowers they had borne?
The moon too has vanished from the sky with a bow
And I sit here on the lonely bank like a wild cravern
While awaiting my turn
Oh ' Lord ' Courage fails in me
With my cup of joy so denied
I cannot laugh not even smile
Tears soak up my bed
And even slumber falls
To chain me
Dearest I have but one request to make
Please do take me under your wings
To share the beauties of your world
Yes forlorn I am without you
I would rather die
Than live without you

# A Collection of Quotations 

Compiled by $R$ LATA

1 Laugh and the whole world laughs with you Weep and you weep alone
For the good old earth must borrow its mirth For it has enough troubles of its own

2 If tears could change the world The whole world would have shed tears in the form of dew drops

3 Beauty of a pearl is in its purity but Beauty of a girl is in her modesty

4 Be like a flower that perfumes the hand that crushes it

5 Happiness is made of little things that mean so much
A smile that speaks a thousand words that tongue cannot express

6 Simplicity is the best of virtues
7 Remember that today is the tomorrow you worried about yesterday

8 Life + love $\rightarrow$ happiness
Life - love $\rightarrow$ sorrow
2 Life $\rightarrow$ happiness + sorrow
Life $\rightarrow \underbrace{\text { happiness } \pm \text { sorrow }}_{2}$
. Life $\rightarrow \frac{1}{2}$ happiness $+\frac{1}{2}$ sorrow
9 Life is like a serpent its touch soft and its bite mortal
10 Love is like a cigar
The brighter it burns the quicker it turns to ashes
19 Remembrance of happiness is worse than a recollection of torments

12 Mistakes are beginning of experience And experiences are beginnings of wisdom
13 Youth is a blossom whose fruit is love Happy is the man who plucks it after watching it slowly riper
14 To meet to know to love and then to depart is the saddest tale of many a human heart
"Power tends to corrupt, and absolute power corrupts absolutely"
-LORD ACTON

# The history of tropical spices 

P A MATHEW

The tropical spices-pepper clove nutmeg connamom allspice cardamom ginger turmeric and others-have been associated with man from ancient times contributing probably the most signi ficant share in the advancement of human civiliza tion They are now a days a household word find ing use in every type of cuisine Their vast history to the present day is coloured with intriguing anec dots which keep one spellbound and make an enchanting reading We will be surprised to know that the present day world is a result of the search for these spices by the Europeans In the following lines you will be reading the panorama of events in the wo ld trade in tropical spices which forced the Europeans to venture into the sea harvesting not only a rich reward of spices but the knowledge of other lands as wall ushering into an era of adventure and exploration

The use of spices in the kitchen is of recent development In olden times they were valued as basic ingredients of incense embalming preservatives ointments perfumes antidotes against poisons cosmetics and medicines

Spices and herbs were in use as early as 2600 to 2100 B C the pyramid age in Egypt where they have been used to preserve the health of slaves employed in the construction of the great pyramids Later cassia and cinnamon were introduced from China and South east Asia for the purpose of embalming dead bodies in Egypt a process in which the interior of abdomen is cleaned and rinsed with fragrant spices These oldest known spices once used for embalming are important baking spices today

The spices found their way to the kitchen during 1 st century A D This was due to a Greek merchant Hippalus who in A D 40 discovered that through the monsoon he could reach the Malabar coast of India in one year than the two years previously taken
and as a result black pepper became an important household word even as today As the Romans built ships on a vast scale commerce with India developed greatly mostly in black pepper Toward the end of the $\mathrm{fi}_{\mathrm{st}}$ century the Romans started excessive use of spices in cuisine Apicius a well known gourmet and epicure of the time wrote ten books on the art of cooking wherein the tropical spices such as black pepper cinnamon turmeric cardamom and ginger are included

Spice flavouied wines spice scented oils and balms for use after bath lamp oil fortified with spices to remove harmful vapours away and poultices and heating plasters impregnated with spices were common during this period of increasing trade bet ween India and the Romans The men were heavily perfumed and the Roman legionaries reeked of the fragrances of the East The Goths Vandals and Huns in the northern side of Alps came in contact with the spices through the Romans

The flourishing spice trade with the Romans developed during the first century was brought to an end by the fall of Roman Empire and the occupation of Alexandria in A D 641 by the Arabs Commerce stagnated and the spice trade between India the Orient and Europe was interrupted until the 12th century when the Mediterranean was re opened to commerce at the time of crusades and spices again became available

The great prophet Mohammed had aiso experiences in spice merchandise After the production of sugar in Persia in the 9 th century the Arab physicians formulated concections made up of spices

Information regarding spices in Europe during the dark dges from A D 641 tre fall of Alexandria to 1096 the first crusade is racher scarce During this period spices were mostly confined to
monasteries After the crusade in 1096 the Westerners came in contact with Eastern spices and developed a taste for them The Italian cities like Genoa Pisa and Venice developed due to develop ment of commerce after the crusades and spices played an important role in this prosperity bringing East and West together culminating in the Renais sance Thus pepper cloves cinnamon and cardamom can be said to have contributed indirectly to the works of Michaelangelo Titian and Leonardo da Vincı

In the 15 th century spices such as pepper cinnamon ginger and cardamom were used in Europe to preserve meat to improve its flavour to camouflage bad odours and flavours and also to prevent Illness The black death or plague was rampant during 1348 the causative bacillus being introduced from East to Europe via these precious spices During the next 400 years European physicians tried every conceivable means of self protection against the plague including a mask filled with spices in its snout to mask odour or filter malignant vapours Sponges were soaked with extracts of cinnamon and cloves and placed beneath the noses of the sick and dying or the rooms fumigated

During the reign of Henry II in 1880 a pepperers guild of wholesale merchants was established in London becoming a spicers guild and succeeded as a Grocers company in 1929 The original pepperers and spicers were the forerunners of the apothecaries who later became medical practitioners Thus for many centuries 4 th century B C to the 17 th century A $D$ spices were among the most important ingredient of materia medica in the middle ages since gold and silver coins were scarce in Europe Peppercorns were usually used to pay taxes rents and dowries

Marco Polos memorrs dictated in 1298 on Eastern spices served to stimulate the great age of exploration which was further augmented by the increased knowledge of geography and navigation fostered during the 15th century by Prince Henry of Portugal So in August 1492 when columbus departed from Palos Spain he was not only looking for gold but also spices especially black pepper and come across the chillies in Cuba

During the 16th century Spanish explorers came upon some large aromatic berries in Jamaica and Cuba resembling in shape and flavour the pepper of India but larger in size and they named them pimie
nta gorda or fat pepper known in England as pimento but commonly called all spice

Vanilla was found in 1520 by solders of the Spanısh conquistador Hernan Cortes while on a military re connassance in the moist shady coastal rain forests of south eastern Mexico This was being used by the Aztees to season theır chocolate and also to pay tribute to their emperor and as a source of perfume or herbal tonic The Spanish took it back to Spain where factories were established to manufacture chocolate with vanilla flavouring during 16th century The use of vanilla spread to other parts of Europe notably England and France For more than three centuries after the time of Cortes Mexico was the leading vanilla producing country enjoying a lucrative monopaly So attempts were made to grow vanilla in tropical far eastern countries including a substantial experimental planting in Java in 1819 where though vanilla flow ered no fruit was obtained This mistery was solved by a Belgian Botanıst Charles Morjan in 1836 by hand pollinating vanilla flowers He pointed out that the Melipone bees/huming birds of Mexico are required to effect pollination and fruit set

In 1841 Edmond Albius a former slave perfected the quick method of hand pollination in use today and by this method Madagascar today produces $80 \%$ of the world vanilla crop

Shortly before Cortes arrived in Mexico the Portugese under Vasco da Gama sailed from Lisbon to East and having rounded Cape of Good Hope came to India in 1498 A few years later the Por tugese discovered that nutmegs were indigenous to the Moluccas or spice Islands of the East Indian Archipelago The clove tree also was native to these Islands The name clove comes from the French clou meaning nail after its resemblance to an iron nall References to clove have been found in Oriental literature dating back to the third century B C in China where the spice was known as chickentongue Officers of the Chinese court in that era were required to carry cloves in their mouth to sweeten their breath when addressing their sovereign

The Portugese controlled the lucrative spice Island s trade in nut meg and clove from 1514 untıl the Dutch explelled them in 1605 who had a complete monopoly during 17th and 18th century Extremely stern and repressive measures were used to maintain Dutch monopoly Any persons illegally planting or trading nutmegs or cloves was put to death The natives of spice islands could offer little resistance
and it was the French who tried to break the monopoly In 1770 Pierre Paivre Governor of the island of Mauritius managed to elude the Dutch authorities and smuggle some clove and nutmeg seedlings from moluccas to the French islands of Bourbon and Mauritius Fruit Pigeons also played a part by swallowing fresh nutmeg seeds and voided them on nearly islands An amusing incident on Dutch administration during 18 th century has been reported Since prices for mace were higher than nut meg an Amsterdam official unaware that both spices came from same tree said to have sent strict orders to the spice islands to cut down a large number of nutmeg trees and plant more mace trees a difficult edict to carry out

By 1818 plantıngs of Mauritus clove seedlıngs had been established in Zanzibar and the Dutch clove monopoly was broken

Nutmeg plantings were established at St Vincent and Trinidad in the early 19th century and in 1843 in Grenada where the best plantantions in the western hemisphere is found

Nutmegs have been prescribed since early times in India as a cure for headaches fevers bad breath and intestinal disorders Since the 9th century this spice hasbeen recommonded in Arabian medical writings as a carminative aphrodisiac treatment of varıous ailments of kidneys and stomach in 14th century England nutmeg in ale was a popular bever age During 16 th and 17 th centuries European physicians and herbalists praised nutmeg as a virtual therapeutic cure all Today nutmeg and mace find use as a mild baking spice

Large doses of nutmeg spice are said to have a narcotic effect and to be stupor inducing due to the toxic substance myristicin which can cause a fatty degeneration of live cells if taken in excess amounts At nutmeg parties hippies eat $2 / 3$ table spoon ful of powdered nutmeg for kicks Following this serıous hangovers headaches nausaa dizziness and occasional death have been reported in normal amounts it is not harmful

Nutmegs have played a part in American folklore and traditions Connecticut for example is known as the Nutmeg state This is due to the tradition that stick yankee peddlers of the early 19th century used to sell whited wooden imitation nut megs as the genuine spice to home wives and their sales man was from connectiut-hence the name Towards the end of the 18 th century the United States for the first time got involved in the world spice trade $A$ remunerative trade was established in pepper from Sumatra that lasted until the civil war of 1861

Presently substantial spice plantations have been established in the Americas The best quality cardamom came from Gautemala the first nutmeg and mace from Grenada and select black pepper from Brazil Thus the spice trade is being gradually extended in the western Hemisphere

Modern developments in processing and chemı cal technology have resulted in the synthesis of flavours akin to the spices that can be prepared from cheap raw materials that may spell disaster for these vegetable products which have been the palates of mankind for so long

Source 'The Book of Spices



Welcome Speech :
Shri R. Muraleedhara Prasad

Inauguration: Shri V. K Sukumaran Nair, Vice-Chancellor,
Kerala University


Speech: Shri C. Narayana Pillai


Welcome Speech: Shri Mohammed Yasin K.

Inauguration: Shri Santhanaraj


Speech: Shri Santhanaraj


Inauguration: Smt. Jothi Vencata Chellum, Governor of Kerala


Speech: Smt. J. Lalithambika Collector, Trivandrum


Address at the closing ceremgny
Sri P. J. Joseph,
Home Minister


Mohammed Yasin receives the
K.A.U. Trophy for overall Championship


Best Actor
Shri Yeroor Narayanan


Bindhu M. receives the prize for first place in Dance (Solo)



Group Dance





Speech: Chief Guest Shri T. Madhava Menon Agricultural Production Commissioner

Speech: Shri Thottam Rajasekharan Director of Public Relations


## AWARDS AND PRIZES



Prizes distributed in the K. A. U. Youth Festival 1978


Shri K. M. Thomas receives the profit from 'Kayal Cultivation'


Shri. J. Thomas receives the Aspee Gold Medal



Volunteers in action


Completing the bund

## உ2லకయంం





๓ว๓าตา

## 



（2）eomesion．
๑еோ゙ぁ
（2minمer．arnsm ஜワcurob

\＆ 5 （xb

囚（


 asoruo cesomono คา ณา๕ณ๓ゅ๐ณ

 eroent


## 
























##  














## 




## 





















## 



























## 

















凹解（Optimum plant population）$m \in \infty$ ช $m \omega$
 6ロ 以


## 

[^1]
## 



 OPJDOM






 ญว๓。 กレロผาゅョ

## 


 NJW












 จา $\omega$ o

##  <br> ๙シถชmา
























 ตระ $\mathrm{ms}^{\circ}$ -


 ณกตตา вวตา"

[^2]



 ตைแั"













##  )


















##    <br> 



#  

## ®ロแை\％า








（ancos anclo $\%$









๑毋า





 कแร？ P

























 Qed






 ตை \＆ாาศロร




 めな్థ。
 ฐๆ๐าญை๐？














๑ワำ ？
（B1）जलयक？



บロ०า









 Desmo

















$\omega_{0}$ ロо ஜா\％gimmuja










 MIOTnvo ロOMロI

வが




凹า








##    <br> ゅゅ๐ઠ

#  











































































































































 ゅமைறைைை๐๗ற்





















































#  






























```
X X X X X X X X
```










## 

## 





















```
вถัก4
```
















# ஹ꺼요o 




 （ூடேレ๐）
























 จดฺุกగิ



 カ®®う。

$$
\begin{aligned}
& \text { cп_nomo ? } \\
& \text { e'momojnd } \\
& \text { mossalso? }
\end{aligned}
$$











 ตรวกช บอาめ mreansา过
















 க๓ஜาํํํํ




$20 ?$



#  











```
EOCO
```












สroe-า@com?

a วロ」mex ?)

 msmo
















 ${ }^{(810)}$




 Socs）












ญ๐าゅ。（？）














 ○าめっの ヵッチา

























 வコケルணை















以0，














 cnomาwาcer




##   

คาฮอย ตฎ

> For all your requirements of Scientific Equipments, Laboratory Chemicals and Laboratory Glasswares

Please Contact

## The Central Scienificic Supplies Company Itt.,

Masjid Bunlding, P B. No. 124
PALAYAM, TRIVANDRUM-695 001
Authorised Stockists and Distributors for
M/s BDH, E MERCK, SARABHAI' ${ }^{\prime}$ '
CHEMICALS, REECHEM H P C AND
PUREX ACIDS AND BOROSIL CORNING GLASSWARES
Registered Office MADRAS 600001
Other Branches
tambaram bangalore coimbatore hyderabad and madural

## TECHNO

Activated Fish Mil Rosin Soap
Popular for 50 years
Techno (hemical Industries Linited
OYITTY ROAD,
KOZHIKODE-1

# The Trivandrum Ex-Servicemen's Automobile Engineering \& Transport Industrial Co-operative Society Ltd. No. S. Ind. (T) 256 <br> Power House Road, CHENTHITTA, TRIVANDRUM 

We Undertake ENGINE OVERHAULING NOZZLE TESTING SMITHY WORKS AUTOMOBILE ELE WORKS LATHE WORKS

## BODY BUILDING

UPHOLSTRY WORKS
SPRAY PAINTING
TRANSPORTATION

#  






















## 























##  































 ต๓รฺ\%











## 

















































 ธกேฒา

## வவவาใ్లว



















## 


















 воノ உ过









 ธามem












凹ราผว๓





























## 



 ตยา










 －า a ${ }^{\circ}$ a















 ロリา













 ©0m ${ }^{\circ}$

## 

## 

## 

ณ1รளூ Mex Mrodavec






 cojos mา coltomาm



















## ＇๑еேツ＂』’


















cロobs Hand

 கッๆ゚ต。

๑ைை＂ゅ Hand ๓еே



 good girl






 ธே กาศा






##  








 çs

ตェற ๓ைற ๓ைต




 œogeno

๓ைற ตบற






றை ๓பற ๙ைற




 ๙ฺை ஃฺา๙ை



















 -)








 (Tn ces.



























#  





















 ๙ைางกอ ฐவை

 æา@иs eronein comio Actually life is a song the more we hear the more we like to hear




 deserve more 32 nd rank in the state is nothing as far as you are concerned But of course 1 know your conditions don t stop yours studies by this





 шாைை
































 ๑ศาตேกร ๑ารู๗๓ถ!!








ஜீూ
 억의 Mathew you have only two attendence in this year for my class Attendence is not a problem but you loose my lecture

































 ญอาఱ ऊாே



















 51m












 (ாைை



















#  

<br><br> 











थान

##   

## Jain Vigyan Kendra

Manufacturers \& Suppliers of
Scientific Apparatus for Schools, Colleges, Universities, Research and Industral Laboratones

Near S. D College Hostels, AMBALA CANTT - 133001 Phone: 20690

Gram<br>Specialists in-<br>A grade graduated Glassware with Works Certificate Gas analysis apparatus all types<br>Plant Physiology apparatus interchangable ground glass joint assemblies Distilling apparatus<br>Thermometers all types Micro analysis apparatus and<br>Any Special Glass apparatus according to specifications

VIGYAN

Manufactured by
IAIN XIGYAN HEENERA
Jain Road,
Ambala Cantt - 133001 (India)

With best complinnents
from

## Shaju Bakery \& Cool Drinks

Overbridge Junction
M G. Road
TAIVANDRUM-1

# கSTM 8(0)OO? 











 คำ






















 ஷ)
 ゅஆறூகதகை ளைை




## 


 ©๓





## 


















































 รักె @รโைา






 هெา?



## 




```
080 me&% &ome\lpJ
```






























```
வ1&%m कா\ाठे வ&థ%
```







Represented the University in the Inter University Athletic meet 1978


Kerala Agricultural University Basket Ball Team


## INDIVIDUAL CHAMPIONS



Jessyamma Joseph


Sverup John


Joy Mathew

OUR TEAMS


Athletics




# Report of the Dean, College of Agriculture, Vellayani for the Academic year 1977-78. 

Honourable Vice Chancellor Shrı N Kaleeswaran Respected Agricultural Production Commissioner Shrı T Madhava Menon Shrı Thottam Rajasekharan Dr Aranmula Harihara Puthran Ladies and Gentlemen

I have great pleasure in presenting the annual report of the College of Agriculture Vellayanı for the academic year 197778

## 1 Staff

During the period under report the posts of Professor of Agronomy and Professor of Agricultural Entomology were filled up and Dr C Sreedharan and $\operatorname{Dr} \mathrm{N}$ Mohandas foined in these posts respectively Three staff members viz Shri M Gopalakrıshnan Naır Shrı C S Ravindran and Shrı PA Mathew were selected for the ARS during this year

## 2 Admission

During the period under report 54 students were admitted to the First Year B Sc (Ag) course ralsing the total number of undergraduates to 320 Twenty nine students were admitted to the first M Sc ( Ag ) course 4 to first M Sc (Hort) and seven to the first year Ph D course during this year The present strength of the full time postgraduate students is 98 In addition to this 10 candidates are working as part time Ph D scholars

## 3 Examınatıons

Seventy eight students completed their under graduate programmes and received BSc (Ag) degree seventy in the first chance and 8 in the second chance Seventeen candidates received their M Sc (Ag) and two Ph D during the year

## 4 Students aids and scholarships

The following scholarships/educational con cessions were awarded to the students

| (1) | Scheduled caste and scheduled tribe students concession | 35 Nos |
| :---: | :---: | :---: |
| (11) | Concession under Kumara Pillaı Commission | 53 |
| (III) | KAU Merit scholarshıps | 40 |
| (iv) | National Merit scholarships to the children of school teachers | 5 |
| (v) | National loan scholarships | 20 |
| (vi) | Natıonal Merit scholarships | 20 |
| (viI) | ICAR Merit cum means scholarships | 20 |
| (viII) | ICAR Junior Fellowships | 7 |
| (IX) | Educational concession to Nagaland nominee | 1 |
| (x) | Educational concession to Meghalaya | 1 |
| (x) | Educational concession to Laccadive students | 3 |
| (xII) | Scholarships from Pyrites and phosphates | 1 |
| (xiII) | Scholarships from Indian Potash Limited |  |
| (xiv) | Subbrato Memorial scholarships | 1 |
| (xv) | Fee concession to OBC | 4 |
| (xvi) | KAU Senior fellowsphips | 1 |
| (xviI) | KAU Junıor fellowships | 33 |
| (XVIII) | Study allowances from KAU | 14 |

In addition to these Shrı J Thomas Final M Sc ( Ag ) student in Agronomy has been awarded the Aspee Gold Medal for the year 197677 for securing the highest standards in Agricultural Entomology and Plant Pathology combined together in the undergraduate level

Miss Mercy Thomas First Year B Sc (Ag) student has been given a cash award of Rs 250;by the KAU in recongnition of her performance in the Inter University Athletic Meet

## 5 Extra curricular and co curricular activitios

The College Union functioned properly with Shrı R Muraleedhara Prasad as President and Shri Abdul Gaffar as General Secretary

The following members of the staff were noms nated to varıous offices

| President Speakers club | Dr A M Thampı |
| ---: | :--- |
| Athletıc Association | Prof J B Rose |
| Plannıng Forum | Dr Skariah Oommen |
| Arts Club | Shrı K P Madhavan |
|  |  |
| Programme Officer N S S | Dr Skarıah Oommen |
| Staff Editor | Dr V Gopınathan Nair |
| Coordınator Hobby Centre | Prof A G G Menon |

Regular activities of all the above organisations were carried out satisfactorly during the year under report

## 6 Training programmes

The following training courses were conducted in the College of Agriculture during this year

1 Training to the Jumior Agricultural Officers of the Department of Agriculture
II Traınıng to the Managerial staff of the Primary Credit Cooperative Societies
III Traıning to the staff of Soll Testing laboratories
iv Trainıng to the staff of the Land Mortgage Bank
v Orientation training to the Medical Officers of the operative ANP blocks
vi Traınıng to the personnels of voluntary organı sations

## 7 Study tours

During the period under report the third year students went on a study tour to North India and the second year students to South India The first year students were taken to the varrous research institu tions in Kerala

## 8 Conferences and Semınars

The members of the staff of this Collecje partı cipated in several conferences and seminars both inside and outside the State like the meeting of the Scientists of Agricultural Universities at the Marat wada Agricultural University Workshop on Problems of Pesticides residues held at IARI Annual con ference and workshop of AICARP at Palampur and the Regıonal Forage Workers Conference at Avadı Two of the staff members participated in the Karshika Mela held in Aminı Island of the Union territory of Lakshadweep

A workshop on package of practices and another workshop on popular writing for farmers were con ducted in this College during the period under report

A number of extension lectures were also conducted in this College during this year

## 9 Publications

The publication of the Agricultural Research Journal of Kerala and Agrı Abstract was contınued during the period

## 10 Village Adoption Programme

The developmental works in the two adopted villages Kalliyoor and Muttackad were continued Activities for the improvement of the socio economic conditions of the tribal area of Pottanmavu were also continued satisfactorily

## 11 Participation in the Flower Fruit and Vegetable Show 1978

The College of Agriculttre Vellayanı particı pated in the 21st Annual Fruit Flower and Vegetable Showand Rose Day 1978 at Trivandrum We also tookpart in the various competitions held in con nection with the above show and won 26 First prizes 4 second prizes and 3 Rolling trophies

## 12 Practical training and work experience programmes

In addition to the regular practicals in the labora tories and fields the students were given small plots of land for cultivation of different crops The first year students raised a crop of taproca the second year students a crop of banana and pulses and the third year students vegetables and maize

The Final year students rased a paddy crop successfully in an area of 13 acres of kaval land in spite of the pre mature harvest due to early monsoon, they were able to produce more than 5 tonnes of paddy A team of press representatives visited the students cultivation plots and appreciated the act vities in practical crop production

The final year students were also taken to the different IPD Units to gain practical knowledge in the implementation of the developmental program mes for a period of 2 weeks They will also be taken to the various Agricultural Research Stations to study the working of research stations and programmes

The final year students also participated in a survey on tapioca cultivation in Quilon District arranged by $\mathrm{M} / \mathrm{s}$ Madras Fertilizers Limited during the inter trimester break The Madras Fertilizers also supplied fertilizers at a subsidised rate to our work experience programmes and garden club

## 13 Research

A total number of 171 research projects were conducted by the Staff of this College during this year

## 14 Hostels

Dr K P Rajaram Dr Abraham Jacob and Smt Alice Kurian continued to be the Assistant Wardens of the Post graduate Hostel Men s Hostel and Ladies Hostel respectively The new Ladies Hostel building is nearing completion

Dr G Gopalan Medical Officer Vellayanı Hospital continued to be the hostel Doctor during the perrod under report

## 15 Agricultural College Co operative Society

The activities of the Agricultural College Co operative Society have been resumed during this year and it functions properly from 111978 onwards Shrı K P Madhavan Nair Associate Professor of Agronomy continues to be the Secre tary of the Society

## 16 Visitors

A large number of distinguished persons visited our Institution this year They include

Her Excellancy the Governor of Kerala Smt Jyothi Venkıtachellum

Hon Minıster for Agriculture - Shrı K Sankarana rayanan
Home - Shri P J Joseph Finance Shrı M K Hema chandran
Mr Nripan Chakrabarthy Chief Minister of Tripura Mr B Hayden Leader of the Opposition Australian Parlament
Shrı K R Narayanan Indian Ambassador to Chına Dr G Rangaswami Vice Chancellor Tamil Nadu Agrl University and Prof D Hall of Kings College London

## 17 Kerala Agricultural University Youth Festival

The Second Kerala Agricultural University Youth Festival was celebrated on the 10th and 11th June 1978 at the Vellayanı Campus Her Excellency the Governor of Kerala Smt Jyothı Venkitachellum inau gurated the Festival Shri $N$ Kaleeswaran Vice Chancellor KAU presided over the function and Smt J Lalithambika District Collector Trivandrum spoke on the occasion

The Kerala Agricultural University Students Union was inaugurated by Shrı Vasudeva Sarma on 10th June and Shrı Syamalayam Krıshnan Naır spoke

In the closing ceremony Hon Home Minister Shri P J Joseph distributed the prizes to the winners of the various competitions The KAU Trohpy for the year 197778 was won by the College of Agriculture

In conclusion lexpress my sincere thanks to Shri N Kaleeswaran Vice-Chancellor K A U for the great encouragements and sympathy shown to this Institution I also express my gratitude to all the staff and students of this College for their coopera tion in carrying out my duties and responsibilities properly

# Report of the College Union for the Year 1977-78 

Hon ble Vice Chancellor dıstınguished Chief Guest Srı T Madhava Menon IAS Srı Thottam Rajasekharan $\mathrm{Srı}$ Aranmula Harıharaputhran res pected Dean members of the staff and dear frends

It is with great honour and profound pleasure that I take this opportunity to present the Annual Report of the College Union for the year 197778

The activities made a zooming start with the election of the College Union constituting the following members

Srı R Muralıdhara Prasad - Presıdent
Abdul Karım - Vice President
$\begin{array}{ll}\text { Abdul Gaffar } & \text { - General Secretary } \\ \text { Thomas Mathew } & \text { - Associate Secretary }\end{array}$
K Raman - Secretary Athletıc Association
Jose Joseph - Magazıne Editor
Mohammed Yasın - Secretary Arts Club
$S$ Devanesan - PG representative
$S$ Mohanan - IV yr
George Mathew - III yr
Saju Peter - II yr
Pradıp Naick - 1 yr
Rajan Mathew - Secretary Plannıng Forum
Ravilal PN - Secretary Speakers Club
Bijou Albin - Secretary Social Service League
Nanda Kumar - Secretary Camera Club
Dr Mohankumar was nominated as the Hon ble Treasurer of the Union Since he left the College on a Senıor assignment Srı Mohammed Hussain took his place

The Union was inaugurated by $\operatorname{Dr} V \mathrm{~K}$ Sukumaran Nair Vice Chancellor of Kerala University at a function presided over by our esteemed Dean Dr N Sadanandan on 7th December 1977

Srı K P Madhavan Nair Associate Professor continued to be the President of the Arts Club The Arts Club was formally inaugurated by Professor Santanaraj on 19th March 1978 The function took a new shape by conducting a Sahitya Sadas in which emınent writers and poets like Dr Ayyappa Panıcker Srı K S Narayana Pillaı Srı Kadamanıtta Ramakrishnan and others took part

An Arts Exhibition which was a one man show of a renowned artist Mr SasıPS (II M Sc) was conducted in the lobbies of the University Students Centre on 6th 7th and 8th of February 1978 The exhibition was a grand success

Dr Skariah Oommen and Dr A M Thampicontı nued as the Presidents of the Planning Forum and Speakers Club respectively Two debates were conducted which attracted a lot of students attention and interest The Inter Collegiate Debate Competi tion for the M R G K Nair Ever Rolling Trophy which was proposed to be held on 1061978 was procra stinated unconditionally due to un warrented precedents But matters will be brought under perspective very soon

Prof K Sreenivasan continued to be the President of the Camera Club The members of the Club carried out their duties by conducting a tour to Neyyar Dam on 21st May and taking photographs at the site

Dr Mary K George Professor of Agricultural Botany continued to be the President of the Social Service League The members observed October 2nd as Cleanliness Day and undertook the task of cleaning College premises and roads inside the campus Social service league extended all the possible assistance to N S S activities during the year under report

Dr Skariah Oommen continued to be Programme Officer of N S S A committee was formed for planning and performing the activities during the year which consists of Mr Balakrıshnan PC Mr Inasi Mr George Jose Mr Harıkumar K G Mr Govindan Mr Narayanan Namboothır Mr Bıjou Albın Mr Gangadharan Pradeep Nark Miss Mary K P

Miss Latha Bastıne Miss Amına and Miss Sherly A Baby Shri George Jose was nominated to the volunteer Secretary

The unit conducted a benefit show and the amount collected was utilised in presenting a Usha Delux Se ving Machine to Sreevardinı Mahila Samajam and extending relief service to the people of Vizhinjam who lost everything in fire disaster The rest of the amount is deposited in bank

A Blood Grouping Campaign was conducted with the help of the officers from Sree Chitra Thirunal Medical Centre

12 N S S Volunteers donated blood for opera tions at SAT and Medical College Hospital

Durina the year under report the NS S volun teers raised 120 vegetable gardens in the village of Kakkamoola and Keezhoor by providing them seeds and fertilizersfree of cost and required tech nical advice

The relief service the volunters had at Vizhinjam Sea shore was highly appreciated by all 700 mats and an equal number of cloth pieces were distributed to the victims of the fire mishap

The unit conducted a special camping programme from 111978 to 5-1 1978 Our beloved Dean Inaugurated the same The most creditable achieve ment of the camp was the construction of a bund across Vellayanı Kayal which is the only link bet ween Kakkamoola and College campus It can be said that practically the insular position of the village was changed by the manual labour put in by the campers The campers also conducted a socio economic survey the result of which was given an important place in all Malayalam dalles and news of A | R The unstincted co operation of the Grama Vikasana Samithı headed by Dr E Tajudeen is behind the success of the camp The N S S Unit place before him its heart felt thanks and gratitude

The N S S Unit like to place its sincere thanks to the Dean programme officer and staff of the

College for their affectionate guidance advice and assistance

Mr Narayanan Namboodiri and Miss Latha Bastine deserve the appreciation and sincere thanks of the Volunter Secretary and whole N S S unit for their notable performance as the Directors of Commu nity Development and Kitchen Garden Raising Schemes of the Unit respectively

The 2nd Kerala Agricultural University Youth Festival was hosted by us on the 10th and 11th of June with Her Excellency Smt Jyothi Venkıtachellam the Governor of Kerala as the Guest of Honour The overall championship was won by our students thus bringing laurels to our college

The outgoing final year students of our college created a sensational record by producing an immaculate yield of paddy in their kayal cultivation pro gramme another feather to our cap

The staff and students of our College were honoured by the visits of distinguished personalities and eminent scientists like Dr G Rangaswamy Vice Chancellor Tamilnadu Agricultural University and Srı Nrıpun Chakravarthy Chief Minister of Tripura Recently the distinguished opposition party leader of Australia Mr B Hayden paid a visit to our campus

I was co opted to the Academic Councll of the Kerala Agrl University 2 months back I had the privilege of presenting the representations of the undergraduate students on that occasion

Before I embark on the task of concluding the report 1 should place on record my sincere thanks to the Dean Staff Advisors and my colleagues of the Union for their unstinted co operation in all our ventures $I$ also owe a deep sense of gratitude to all those well wishers and benefactors who have helped in the smooth functioning of my office

## Thanking you

General Secretary

# Report of the Athletic Association for the Year 1977-1978 

Respected Vice Chancellor distınguished guests esteemed members of the staff and dear friends

I deem it a pleasure on my part to place before you the report of the Athletic Association for the year 19771978 Our activities made a good start by the nomination of members of the association and the captains of various games

It is noteworthy that the teams for Athletics and games from this college brought many laurels after bagging first places in basket ball volley ball foot ball cricket hockey table tennis and Badminton (both in the men s and women s section) with an only second place for women hockey in the Kerala Agrl University Inter collegiate games and sports

The individual championships in athletics were bagged by Mr George $\mathrm{K} J$ of final year $\mathrm{B} \mathrm{Sc}(\mathrm{Ag})$ Mrs Jessyamma Joseph 2nd year B Sc (Ag) and Mrs Mercy Thomas 1 st year B Sc (Ag) in the men $s$ and women s section respectively

Pror to the inter collegiate games we were able to build up team standards by inviting numerous teams from Trivandrum district for practice matches in various games The concerted efforts coupled with strong determination were instrumented in these jubilant victories

The college could also present teams for district league matches in Basket ball and Hockey We were runners up in both the games

These triumphs triggered more initiative and drive among our athletes and players thereby helping them in getting berths in the Kerala Agricultural University teams for Hockey Football and Basket Ball The cream of the teams comprised of Agricos players The following were the players who donned the university cap in athletics at the InterUniversity Athletics held at UJjain Joy Mathew (Captain) Sverup John Abraham C T, Mercy Thomas and Jessyamma Joseph

Miss Mercy Thomas of the 1st B Sc (Ag) deserve special commendations for her unique achievement in the High Jump event where she cleared a height of 154 m and secured the second place at All India level This is a distinction which is the first of its kindin the College Athletic History and it has rightly earned her a cash award of Rs 250

The members of the Hockey team who took part in the inter university hockey tournament held at Hyderabad were Kurien Mathew Kurien John George K J Sası P S Abdul Gaffar Anıl Thampan and Venugopal

The versity Foot ball team consisted of the following players Jayakumar Kurien John George K J Ahmed P Ibrahım K K Sayed Alı and Rajendian $P$ The inter university Foot ball tourna ment was hosted by the Kerala Agricultural University at the Mannuthy campus Trichur

At the Inter University Basket Ball Champion ship held at Madras the following University players were from our college Joseph E J Thomas J Ramesh kumar Babu M Philip Joy Mathew Joseph J Puthusseril Cyriac Mathew Joselet Mathew and George Tharakan

On this occasion I would bestow my very sincere thanks to our Physıcal Director Snı S P Pıllaı for his technical advice and valuable guidance in all our ventures 1 am also grateful to all the students who played crucial roles in the general conduct of various games in this college Hoping for the best and wishing my successor a very fruitful time I conclude my report

Thank you one and all

Athletic Secretary

## Report of the Hostel Association for the Year 1977-78.

Respected Vice Chancellor Mr Padmarajan Dean Assistant Wardens members of the Staff and my dear friends

I have great pleasure to place before you the report of the activities of the $U G$ Mens Hostel for the year 197778 The new Executive Committee of the hostel with Dr Abraham Jacob Assistant Warden as Charman was formed on 121978 Dilp Chandran was nominated as the Hostel Secretary Thulasidharan as Reading Room Secretary and Mohana Krıshnan as Ampligram Secretary

The activities were carried out smoothly throughout the year because of the hearty co oper ation of the inmates and the keen interest taken by the Assistant Warden in each and every item con nected with the Hostel

The people who were rendered homeless and helpless due to the extensive fire accident at Vizhinjam were substantially helped by the inmates with liberal contribution money and other materials
like mats cloths etc Many students worked day and night to give relief to the grief stricken fishermen families

The campus has been beautified by the initiative of the Garden Club They have brought up a nice kitchen garden Competitive programmes on various indoor games were organised and a large number of inmates participated actively Secretaries tor indoor games in the Mens and Ladies hostel deserve con gratulations in this regard

The hostel executive arranged screening of 5 films for the benefit of the students We were lucky to get a Stereo Record Player in our Hostel this year and many records were purchased utilising the students fund

I take this opportunity to express our sincere thanks to Dr N Sadanandan our Warden for his keen interest in the day to day affairs of the Hostel I also thank all the members of the staff who helped us and co operated with us in all our activities throughout the year

Thanking you

Hostel Secretary

# Out-Going Students-B.Sc. (Ag) Programme 1974-78 

Abdul Khadar Kallar Kottakandam Rajapuram PO Hosdurg Cannanore

Ahammed P Karat House Kakkoth Perınthalmanna PO Malappuram

Aıpe K C Kunneal Chungakkunnu PO (via) Tellicherry Pin 670674 Cananore Dist
Alice Antony Venattu House Thuruthicadu P O Kallooppara Mallappally
Ambika devi Kocheril Poonjar Kottayam Dist
Anilan R Thittayil Veedu Kadakam P O Chırayınkıl Tvm Dist Pın 695304
Asha devi varma Devi Nivas College Hill Kothamangalam College P O Ernakulam District
Babyraj E Edappangathıl House Mulamthuruthy PO Ernakulam
Balakrishnan P C Karuvachery Near C C R S II Nileswar PO Cannanore
Cyriac Mathew Thottichıra House Kumarakom P O Kottayam
Estelitta S Thoppuvila house Mundat Varkala PO
Francis Ansalam Kurissupurakal House Arthungal PO Sherthala
George K J Kanırakkattu House Pullurampara P O Thiruvampady (via) Calıcut
Gokulapalan C TC 23446 A Lexmı Nilayam Vanchiyur Trivandrum
Gopinathan Nair P Charuvuvilakathu Veedu Melaranoor Karamana P O Trivandrum
Gregory Zachriah Pullikkottıl Poonkunnam P O Trıchur 2
Harı Kumar R Ganesh Bhavan Pazhavadı Street Nedumangad P O 695541 (Tvm Dist)
Hebsy Bai Hebsy Villa Kunnapuzha Thirumala Trivandrum 5
Ibrahım K K Kolliyıl House Jews Street Ernakulam P O
InasıKA Kudarappillıl Chırakkakom Varappuzha P O Ernakulam
Jagadeesh Kumar T N Thayyll House Thodupuzha P O Idukki

Jaıkumaran U C o M S Naır Uppath House Pariyaram P O Trichur Dist
Jalaja kumarı M B C/o M I Bhaskaran Maya Nivas Vadakkancherry P O
Palghat Dist Pin 678683
Jayamohan S Edakkunnıl House
Ezhakulam Parackode P O Quilon
Jayaraj T R Raj Nivas
Kanıchikulangara $P$ O Sherthalaı
Jessy P Jacob C/o A J Francis
Akkarakkaran Hosue Church Square Irinjalakuda
Joseph J Puthusseril
Puthusseril House
Athirampuzha P O Kottayan
Joy Mathew Pazhoor House
Palaı P O Kottayam
Kamarudeen M C K House
Kummil, Kadakkal Quilon Dist
Koya C Purakkad Cherrıya Purakkad House
Kalpenı P O Laccadeeves
Kurian John 3 B Jalan Pelandok Taiping Perak Malaysia
Laila L S N Vilas Chempazhanthy P O Trivandrum 17
Lekha Sreekantan Savee TC 33 441/1 Perunthannı Trivandrum 8
Mahesh chand B Lexmı vilas Gowrivilas lane PO Kowdiar Tvm 3
Maicy kutty $P$ Mathew Pampoorickal house Cherappady P O Kottayam Dist Pin 686520
Manju P C ok Peethambaran Narr Police quarters for DYSP S A P Peroorkada Trivandrum 5
Marykutty Samuel Thevallı house Muttada P O Trivandrum 25
Mary C A C/oCJ Augustine Cherıyampurath Kalangalı Athıyodı $P$ O Calıcut (Dist)
Mary K P Co Mr Velayudhan Pandyamahl House Kanıramattam PO Ernakulam
Mathew A V Ammianickal House Moonmlavu P O Plassanal (via) Kottayam

Mohanan S Sobhanamandıram
Near Rallway Bridge TC 301406 Chackaı Beach P O Trıvandrum 7
Moideen K K , Kambathu House Cheruvathoor P O Kothamangalam Ernakulam Dist
Moidu M K P Andoor Parassınıkkadavu P O Kallissery (via) Cannanore
Nandakumar C TC 23808 Devi Nilayam Subramania swamy Kovil Road Thampanoor Tvm 695001
Nandını K C/o Mr K D Nambiar Kızheeparamba P O Areacode Malappuram (Dist)
Narayanan A Thondıyara Edayıl Veedu Yelamuttom Yeroor P O Anchal (via)
Nazeema A Jamalia building Anjengo $P$ O
Padmanabhan V B Padma Bhavan Chilacore Varkala P O
Philip M M Mundakathil House Edathua P O Alleppey Dist
Prabha Kumarı P Padmabhavan Keezhcherımel Chengannur
Premachandran R TC 45303 Manacadu Tvm 9
Premnathan T Thalathil House Kottayampoll Pathayakkunnu (via) Tellicherry
Presenna Kumarı Lekshmı Nıvas Karapuzha Kottayam 3
Rajamony L TC 221079 Thaıckadu P O Trivandrum
Rajendran P Vaccanadu P O Kuzhımathıkkadu (via) Quilon
Ranjan S Karıppaı Karıppai Cheraı P 0 Ernakulam
Rehumath Niza T J Green View Avaneeswaram R S P O Kottarakkara (via)
Renjth A M CoP V Krishnakumar Telephone Instructor Nileswar
Salahudeen V U Ummer Manzil Veliyathunadu (west) Alwaye
Samuel Mathew Kelachan House Thattarambalam P O Tarıpuzha Mavelikara

Sanu K C Kalathingal House Moothakunnam N Parur Ernakulam
Sasidharan B Geetha Bhavan Kalanjoor P O Pathanapuram Quilon
Sheela Paul T Comr T A Paul Thokkalemkulathil Pdzhamthottam PO Alwaye
Shyam Kumar E S Shyam Nivas Varapuzha P O Ernakulam
Sivaramakrishnan S 38/115 Ist Puthen Street Trivandrum 695009
Solomon Chacko Virippil House Payıpad P O Haıpad Kerala State Pın 690514
Sudharma K D o P Karvarnan PO Quarters Sasthamangalam P O Trivandrum 10
Sulochana TS Therappel House Edamattom P O Bharananganam Kottayam (Dist)
Sukumari P D/o Mr Sreedharan Pillaı Yogeeswara street Akkaral Sucheendram P O KK (Dist) Tamil Nadu
Suma Bai D 1 Punnathottam House TC 17/1306 Thrikkannapuram Trivandrum 6
Sumam George C/o P V George Palakatharayıl Vellayambalam Sasthamangalam PO Tvm 10
Sunny K Oommen Kulanjeelazerkath Mannady P O Vıa Kulakkada
Susannamma Kurien C/o M Kurien G K Rose Villa Thalachira P O Kottarakkara
Sverup John Mithrapuram Bunglaw Paranthal P O Pandalam (via)
Thomas K M Kunnakkattu House Muthalakodam PO Thodupuzha
Uma devı K Mullasserı Veedu Cherunnıyoor P O Varkala
Ummerkutty C P T K House Manakkayı P O Kayanı (Via) Mattanur Cannanore District Pin 670702
UshaKunarı R Chcruthala House Arattupuzha P O Puthencavu Chengannur
Vikraman P Vettivıl Thekkethıl Veedu Karıyara P O Punalur Quilon Dist

## M.Sc. (Ag.) Programme -1976-78

Abraham C T Chirathadathil House Kuravilangad P O Kottayam (Dist) Kerala
Baby P Skarıa Puthusserıl House Arurappara Kuruppampady P O Ernakulam (Dist) Kerala
Babu M Philip Mylolical House Punnavelı P O Thiruvalla Alleppey (Dist) Kerala
Balachandran K R Raahamandıram Opp DEOs Office Attingal P O Trivandrum (Dist) Kerala
Balakrishna Pillaı G Kalpana
Co operative College Road Trivandrum P O Trivandrum Dist Kerala
Bhaskaran S Near St Xavier s Church North Street Kottar P O Nagercoll Kanyakumarı Dist Tamilnadu
Humayoon Kaleel M Naoıı Nivas Pallithottam Quilon Dist Kerala
Jayachandran B K Kottappuram Kamukınkode Kodangavila P O Neyyattinkara Trivandrum Dist Kerala
Job Sathyakumar C TC No 11/1201 Bains Compound Nanthancode P O Trivandrum Dist Kerala
Kondapalle Chalapathı S o Shrı Kondapalle Eswararah Chinnatippasamudram P O Chittoor (Dist) Andhra Pradesh
Koteswara Rao Naidu S S o Venkataswamy Kothapeta P O East Godavarı (Dist) Andrapradeh
Krishnakumar K Comrs M Karthika Division of Agronomy R RII Kottayam Dist Kerala
Lala S S Jaya Chembakassery Rood, Pattom P O Trivandrum Dist Kerala
Laksinmanan P Mandagapalayam Kumaramangalam P O Thiruchengode Salem Dist Tamilnadu

Madhusuodanan Nair K Krıshnamangalam Kuzhımattom P O Kottayam (Dist) Kerala
Manı T Cherıyan Thayıl House Olassa P O Kottayam Dist Kerala

Marıyappan H TC 12/441 Arappuravilakom House Oormadam Road Kunnukuzhy P O Trivandrum Dist Kerala
Mohamed Alı A B 39/129 KSC Road Pullepady P O Ernakulam Dist Kerala
Mohan B K TC 7399 Poojappura P O Trivandrum Dist Kerala
Muraleedhara Prasad R TC 28475 Seevelı Nagar Kathamukku P O Trivandrum (Dist) Kerala
Pandyaraj S S o Dr Subramaniam Research Officer Sheep breeding Research Station Pottanerı P O Mettur Salem (Dist) TamıInadu
Rajagopal P Karunanılayam Kızhakkumbhagom Ettumanoor P O Kottayam Dist Kerala
Rajeevan M S Mangalathu veedu Puthenthura P O Neendakara Quilon (Dist) Kerala
Rajmohan K Ruby Cottage Srimivasapuram PO Trivandrum (Dist) Kerala
Rajendran P Ravimangalam Near Govt Dispensary Kadampanadu South P O Qullon (Dist) Kerala
Ramachandran D Kovvur Ballippadu P O West Godavarı (Dist) Andhra Pradesh
Ramakrishna Bhat H Near LV Temple Kanhangad PO Cannanore (Dist) Kerala
Sası P S Puthethuparambil Memury P O Kallara (via) Kottayam (Dist) Kerala
Subramona lyer M House No 4 Vrindavan Pongummoodu P O Trivandrum (Dist) Kerala
Suma Kuruvilla TC 4/1436 Peroorkada P O Trivandrum (Dist) Kerala
Syed Moshın Ibrahım S/o Shrr S A Azeom 25 Pallivasel Lane Kazımar Street Maduraı (Dist) Tamil Nadu
Thamas J Thalamala Estate Vayitiri P O S Wynad Calicut Dist Kerala
Vijayan M Saral CIT Colony Muttada PO Trivandrum (Dist) Kerala

## Our Advertisers

The Plantation Corporation of Kerala Limited Kottayam
Madras Fertilisers Limited Trıvandrum
Directorate of Coconut Development Cochin
Pfizer Limited Bombay
The Kerala State Co operative Bank Limited Trivandrum
The Swadeshı Chemicals Private Limited Bombay
Allied Publishers Private Limited Madras
State Bank of Travancore Trivandrum
Shaw Wallace and Company Limited Madras
Travancore Chemical and Manufacturing Co Ltd Alwaye
Kerala Co operative Central Land
Mortgage Bank Limited Trivandrum
Directorate of State Lotteries Tisvandrum
Bharat Pulverısing Mılls Private Limited Kottayam
E K Arumugham Pillaı Trivandrum
Mysore Agro Chemıcal Company Mangalore
Borosil Glass Works Limited Madras
Rallis Indıa Limıted Cochın
Reechem Private Limıted Madras
Widsons Scientific Works Delhı
Metzer (Indıa) Optıcal Instrument Co Bombay
The Central Scientific Supplies Company Ltd Trivandrum
Techno Chemical Industries Limited Calicut
The Trivandrum Ex Servicemens Automobile Engineering andTransport Industrial Co op Society LtdTrivandrum
Jaın Vigyan Kendra Ambala
Shaju Bakery and Cool Drınks Trıvandrum
Farm Information Bureau Trivandrum
The Fertulisers and Chemicals, Travancore
Limited Udyogamandal.

## Statement about ownership and other particulars of the 20th issue of the Agricultural College Magazine

FORM IV (See Rule ${ }^{8}$ )

1 Place of publication
2 Periodicity of its Publication
3 Printer s Name Nationality Address

4 Publisher s Name
Nationality
Address

5 Editor s Name
Nationality
Address
6 Name and address of individuals who own the Magazine and Partners or share holders holding more than $1^{\circ}{ }_{0}$ of the capital

## Vellayanı

Annual
Dr $N$ Sadanandan Indian
Dean College of Agriculture
Dr $N$ Sadanandan
Indian
Dean College of Agriculture
Dr $N$ Sadanandan
Indian
Dean College of Agriculture

College of Agriculture
Vellayani 695522

[^3]Vellayanı
Sod
5379
Publisher

## CROP MIXING

## A new concept for Enhancing Income from your Farm and Homestead

Cultivate Cocoa, Nutmeg, Clove and Tapioca as intercrops in Coconut and Arecanut Gardens

## You can usher in Prosperity and Happiness in the Family by keeping a cow and some poultry

Kindly contact the nearest officers belonging to the Departments of Agriculture Anımal Husbandry Daıry Development Community Development Blocks and Special Agricultural Development Unit for getting practical suggestions in farming

Your Guide to Farming

## KERALA KARSHAKAN <br> (Malayalam Fortnightly)

Annual Subscription Rs. 6 only

Gram FARM NEWS
Telex 0884
292


 m凹o 㤟与mm MT\＆ cracpoonr





 a د． （7）






#   

## 

- 


 ศ10S
*mboctd
 8ns กมฉ Бのmseani (

 กลั"ร๐д
 ๑) 2 )

group on Integrated Rural Development working in the ICAR has developed the following guide lines
a) The programme must provide gaınful employment and increase the purchasing power of the rural poor in particular landless labour margi nal farmers artisans women and children
b) The job opportunities should be provided through the application of science and technology in making optımum use of existıng local resourceshuman anımal plant soll water mıneral and other resources
c) The programme should be simple enough to operate and economically viable so as to ensure that it is quickly capable of achieving self reliance and self replication under similar or varying conditions

The broad term rural development has been viewed differently by different experts For example the Agricultural specialist equates rural development with increased agricultural production or the indust rial specialist with increased output in Cottage or small industries without the least regard for who produces it or who pays for it or who is benefited from it

But the aim of Integrated Rural Development is to have a cumulative effect of these so as to promote the generation of opportunities for gainful employ ment through the optimum use of locally avalable resources

Originally the C D projects in India were more or less based on this philosophy Integration cannot be achieved overnight it is a step by step process and the forms and methods of integration have to change as conditions change

Now let us consider some of the suggestions for fulfilling the above mentioned integration-

1 Integrated rural development should be viewed as a process for local self government within the framework of national objectives and programmes This again calls for decentralisation and popular participation in decision making at various levels as permitted by the political structure and public administration system

2 The greatest obstacles for achieving better integration are bureaucratic professional and political in nature As a solution to this the programmes should be viewed from the peoples perspective,
under standing their needs problems and develop ment potential

3 Every kind of development requires sub stantial learning inputs This is why education broadly defined is so fundamental to rural develop ment A man may have learned how to use new varieties and modern inputs or a new technology in his trade and be anxious to apply them but if he cannot get hold of them his new education frustrates him So it must be made available in the rightful form amount and relationships

4 There must also be local institutions to work through such as Cooperatives youth clubs vilfage councils farmers forums womens clubs library services etc. Development activities do not take place merely in an organisational set up They must mobilise and channel the efforts of local prople and the support of local resources and enjoy the confidence of the members

The national objectives of providing the basic minımum needs of common man such as food water clothing shelter health education communication and adequate employment are to be achieved by the full development of the natural endowments of each region over a period of time safeguarding the quality of environment Man creates everything for his material benefit from his interaction with nature in India a large share of this interaction takes place in the villages

Educational communication should make people participate in this programme Communication planners have a challenging and supporting role in this process Their effectiveness depends on their ability to work with other experts from other fields willingness to learn about the communty and to adapt their communication technology to the community groups and to the people

The technologists should be helped to see the rural elements in the broad perspective bringing them and the people together A scientific awareness should be created among the villagers to help them explain their needs to the technologists and motivate them to develop an indegenous technology by introducing the foreign and urban based science and scientist on the native soll to help them draw the native energy and forces for development

5 Integrated project requires a series of linkages with various Governmental and non governmental agencies as well as research institutions


[^0]:    "Education makes a people easy to lead, but difficult to drive, easy to govern; but impossible to enslave'

[^1]:    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    
    

[^2]:    
    
    
    
    
    
    
    
    
     meim న10 (Minımum yield guarantes progr
    
    
    
    
    
    
    
    
    
    
    

[^3]:    1 Dr $N$ Sadanandan hereby declare that the particulars given above are true to the best of my knowledge and belief

