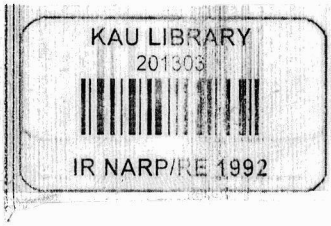
REPORT ON SOUTHERN REGIONAL NARP MEETING

KERALA AGRICULTURAL UNIVERSITY
VELLANIKKARA, THRISSUR
Dec. 7 - 8, 1992



S. Gangopadhyay

SOUTHERN REGIONAL NARP MEETING

December 7-8, 1992

Kerala Agricultural University,
Vellanikkara, Thrissur-680654.

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SOUTHERN REGIONAL NARP MEETING

Venue: College of Horticulture, Vellanikkara.

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7-12-92 Monday	09.30 AM	-	Registration
	10.00 AM	-	Inaugural Session
			Chairman - Dr. S.P. Ghosh, Project Director, NARP
			Invocation
			Welcome - Dr. M. Aravindakshan, DR, KAU.
			Introductory Remarks - Dr. S.P. Ghosh, Project Director, NARP
			Zonal Package of Practices, Lead and verification functions - Dr.S. Gangopadhyay
			Farming System Research & Management Information System - Dr. A.P. Saxena
			Fisheries, Livestock & Animal Management - Dr. Arun Varma
			Inaugural Address - Karshakasree Velayudhan
			Felicitations - Dr.S. Gangopadhyay
			Chairman's concluding remarks
			Vote of thanks - Dr. C.C. Abraham, Associate Dean, COH, Vellanikkara.
	10.30 AM-11.00 AM		Tea break

Technical Session - III APAU

2.00 PM
3.00 PM

Chairman - Dr. G.D. Radder, DR, UAS Dharwad

Rapporteurs - 1. Dr. K.M. Rajan, AIR, KAU
2. Dr. T.N. JagadishKumar, Assoc. Prof., KAU

Zone-specific Package of Practices
Lead and Verification Functions
Farming System Research
Management Information System

Presentation by the Director of Research, APAU supplemented by Assoc. Directors of APAU

(Tea will be served in the hall)

3.00 PM
3.30 PM

Technical Session - IV

Research Extension Linkage - Dr. S.P. Ghosh, ICAR
Dr. N. Mohanakumaran, KAU

Technical Session - V UAS, Bangalore

3.30 PM
4.30 PM

Chairman - Dr. G.D. Radder, DR, UAS Dharwad

Rapporteurs - Dr. K. Kumaran, AD, KAU
Dr. Jose Mathew, Assoc.Prof. KAU

Zone-specific Package of Practices
Lead and Verification Functions
Farming System Research
Management Information System

Presentation by the Director of Research, UAS Bangalore supplemented by Associate Directors UAS Bangalore.

2.00 PM
3.00 PM — Plenary Session

Chairman - Dr. S.P. Ghosh,
Project Director, KARP, ICAR

Rapporteurs - Dr K. Kumaran, AD, KAU
Dr. U Mohamed Kunju, AD, KAU

Presentation of recommendations by the respective Directors of Research

Vote of Thanks - Dr. M.S. Nair, AD, KAU

3.00 PM
5.00 PM — Field Visits

9-12-92
Wednesday — Finalisation of reports

Dr. S. Gangopadhyay, ICAR

Dr. U. Mohamed Kunju, AD, KAU

N.B: Since 8th December 1992 was declared as BANDH in Kerala, the sessions were continued upto 11.00 PM on 7-12-1992 without changing the schedule.


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SOUTHERN REGIONAL NARP MEETING

Minutes of the inaugural session of the Southern Regional NARP Meeting

The inaugural session of the Southern Regional NARP meeting was held at 10.30 AM on 7-12-1992 under the Chairmanship of Dr. S.P. Ghosh, Project Director, NARP at the College of Horticulture, Vellanikkara.

Dr. M. Aravindakshan, Director of Research, Kerala Agricultural University welcomed the distinguished guests. Dr. S.P. Ghosh in his introductory remarks explained in detail the objectives of conducting this regional meeting. He informed the house that Dr.M.V. Rao, Vice-Chancellor is one among the three scientists chosen for the prestigeous Borlaug Award for his outstanding contribution to agriculture. Dr. Gangopadhyay, Principal Scientist, NARP, ICAR delivered a talk on zonal package of practices and lead and verification functions. Dr. A.P. Saxena, Asst. Director General, NARP, ICAR briefed on farming systems research and management information system. This was followed by a talk by Dr. Arun Varma on fisheries, livestock and animal management. This was followed by the inaugural address by Karshakasree Velayudhan. In his talk he explained the circumstances under which he was honoured with the Karshakasree Award. He followed intensive farming systems research involving crop, livestock, fisheries, honey bee, pigs, poultry etc. in 30 ha of land. His contribution to the above areas as well as inter-cropping, mixed cropping, etc. are examples to be followed by others for increasing productivity per unit of land and other resources available with the farmers for increasing income. He requested the participants and other scientists to visit his farms. Sri Velayudhan

inaugurated the Southern Regional NARP meeting by lighting lamp.

Dr. Gangopadhyay, Principal Scientist, felicitated Sri. Velayudhan for having honoured with the 'Karshakasree' award. The selection was made by a committee consisted of international scientists with Dr.M.S. Swaminathan as Chairman. The Video film of all the contestant farmers were examined by the experts and after spot verification and visiting the farm Mr. Velayudhan was awarded Rs.1.00 lakh and a Gold Medal as Karshakasree Award by the Malayala Manorama daily which is the most prestigeous honour to a farmer. So it was pertinent to inaugurate the NARP Southern Regional meeting through Karshakasree Velayudhan.

Dr. Gangopadhyay also felicitated Dr. M. Aravindakshan Director of Research, Kerala Agricultural University for the successful implementation of NARP concept and programme in the State of Kerala which was adjudged as best in the country by the World Bank experts.

The inaugural session was concluded with vote of thanks by Dr. C.C. Abraham, Associate Dean, College of Horticulture, Vellanikkara.

TECHNICAL SESSION - I

KERALA AGRICULTURAL UNIVERSITY

Chairman : Dr. S. Chellaih
Director of Research
Tamil Nadu Agricultural University,
Coimbatore.

Rapporteurs : Dr. G.R. Pillai,
Assoc. Director of Research,
Kerala Agricultural University.

Dr. K. Aravindakshan,
Associate Professor,
Kerala Agricultural University.

In the introductory remarks, the Chairman requested the Director of Research and Associate Directors of Research of different zones to present the report under four specific items namely:

1) Zone - specific package of practices,
2) Lead and verification functions,
3) Farming system research, and
4) Management information system.

Dr. M. Aravindakshan, Director of Research, Kerala Agricultural University, was requested to give an over view which will be supplemented by the Zonal Associate Directors.

Dr.M. Aravindakshan, Director of Research presented few slides showing distinctive characteristics of 5 different zones of the state namely Northern zone, High Range Zone, Central Zone, Problem zone and Southern. He briefly explained the lead and verification functions of different research stations of each zone. He also highlights the major location specific recommendations brought out by different zones such as:

(.....2/-)

Calyxin against stembleeding of coconut and Management of quick wilt disease of pepper in Northern Region, Evaluation of High yielding variety of Cardamom PV-1 and control of Azhukal disease of Cardamom in High Ranges, evoluti n of Rice varieties suited to different seasons and situations, irrigation scheduling of different crops in Central Region, Bio-control of Salvinia, sub-surface drainage and evolution of High yielding Rice varieties for problem areas of special regiun, identification of Cassava, vegetables and fodder varieties and homestead farming in Southern region.

He also explained the computerised Agricultural Experiment information system which is being followed in the University. Computer in the University is used for:

1) Agricultural Experiment Information
2) Manpower
3) Station Inventory
4) Finance and
5) Statistical Analysis.

He pointed out that major factors responsible for successful implementation of NARP in Kerala Agricultural University were effective monitoring at different levels, delegation of powers to regional Associate Directors, proper accounting and good linkage with extension agencies.

Presentation by Associate Directors of Research.

i) NORTHERN REGION

Dr. N. Krishnan Nair, Associate Director presented the major achievements. The following improved varieties of crops released/recommended were included in the Zonal package of practices.

(.....3/-)

a. Coconut : 1) Laksha Ganga
2) Kera Ganga
3) Ananda Ganga
4) Kera Sree.

b. Pepper : 1) Panniyur - 2
2) Panniyur - 3
3) Panniyur - 4

c. Cashew: : 1) K 22-1
2) H 3-7
3) BLA 39-4

d. Rice

Neeraja for flood prone area.

e. Watermelon : Sugar baby.

The other major recommendations were the fertilizer for Coconut (0.5:0.32:1.2 NPK kg) Pepper (o.14:0.55:0.275 kg/plant/year), and Cashew (0.5:0.125:125 kg/ton/year), Calysin treatment against stem bleeding of Coconut and Management package against quick wilt disease of pepper. He also projected slides depicting the region as a whole, the Research stations, Laboratory buildings, Hostels and Quarters constructed under NARP, Cropping Systems and improved varieties of crops in the Zone.

Question:

Dr. Ghosh: Q. How dies your research programmes differ from CPCRI?

Ans. The University gives stress on development of varieties, and farmers field oriented research.

Dr. Ghosh: Q. Whether you are testing varieties developed in similar zones of other states of South India?

(.....4/-)

Dr.M. Aravindakshan. Ans. Yes.

Dr. Ghosh also emphasised the need for making use of the limited resources and funds for farming system research which has relevance to the zone. All our future programmes should be planned in this line.

ii) SOUTHERN ZONE

Dr. N. Mohankumaran, Associate Director presented the report. Under lead and verification functions, some changes have been made. In Vellayani instead of Cassava based farming system, research on partially shaded conditions under homestead systems and research on export oriented flowers and vegetables were included in Kottarakkara, Water Management studies were also included. At Balaramapuram and Karamana there was no change.

The important items included under zonal package of practices are the following :-

1) Control of sheath blight/sheath rot in Rice using Carbofuran, potassium and vitavax.
2) Fertilizer recommendation for coconut and red banana in red soils.
3) Striga control in Rice with 2,4-D,
4) Coreid bug control in Coconut based on state wide survey,
5) Release of improved varieties of Crops:

   a. Green Chillee : Jwala Mukhi, Jwala Sakhi
   b. Sweet potato : Kanhangad
   c. Bhindi : Kiran
   d. Rice : Arathi.

(.....5/-)

Question: How the Carbofuran controls the sheath blight disease?

Dr. Gangopadhyay : Ans. Carbofuran will destroy the Sclerotia in the Soil.

Dr. Ghosh. Q: Have you got any programme for large scale production of seeds of the location specific varieties newly released to meet farmers demand?

Dr.M.Aravindakshan. Ans: Already there is a programme for production of Breeder and foundation seed of the location of specific varieties in the University. Further the University has already chalked out a programme for large scale production of vegetable seeds in the boarder districts with financial support of EEC.

Dr. Ghosh. The University can also think of making use of the revolving fund provided by ICAR for seed production as being successfully implemented in Mango graft production by KKVP, Dapoli.

iii) CENTRAL REGION

Dr.K.M. Rajan, Associate Director of Research presented the report. The lead function of the region is rice and rice based cropping systems. The following recommendations were included in Zonal Package of practices.

I. Rice

(i) Rice varieties:

Matta Triveni

Jyothi

Neeraja

Neela

Swarnamodan

Swarnaprabha, and

(.....6/-)

Rasmi.

ii) Crop Management

a. Fertilizer recommendation for Jayathi and Mushuri

b. Fertilizer dose for Koottumundakan system

c. Increased N use efficiency by Urea super granule placement.

d. Reduction in fertilizer by 25% in Rice-Rice-Green manure and Rice-Rice-fallow systems.

e. Economic control of weeds using chemical weedicides for direct sown rice.

f. Economic irrigation scheduling for second crop rice.

g. Rice-Rice-Bhindi crop sequence for maximum returns.

iii) Crop Protection

1. Spraying cowdung slurry for controlling bacterial leaf blight,

2. Triazophos for the control of leaf folder

3. Chlorpyriphos against gall midge

4. Validacin 3L against sheath blight

5. Seed dressing with Fungorene/Bavistin followed by Bavistin spraying at 2 stages for the control of rice blast.

iv) Post Harvest Technology

1. A paddy winnower cum cleaner was developed.

2. Extending viability of paddy seeds by storing in poly bags (700 guage)

II. Fruits

a. Banana

1. Application of fertilizers in six split doses for Nendran.

2. Retention of 1 follower for ratoon crops in Mysore Poovan

3. Retention of one sucker for the ratoon crop of Nendran

(.....7/-)

4. Sucker dipping with Neem oil, tobacco, decoction and fish oil soap against burrowing Nematode in banana.

5. Technologies were standardised for preparation of chips, halwa, Cutlet, pickles etc. from banana, jacks and pineapple.

b. Cashew.

1. Varieties released: Madakkathara 1 and 2
Anakkayam - 1

2. Top working to convert unproductive old trees to productive new types by grafting.

III. Coconut

1. Basin irrigation with 500 l. of water at 50 mm CPE.

IV. Vegetables.

Identified varieties suitable for river bed system of cultivation of following crops.

a. Bittergourd : MC-84
b. Brinjal : Surya
c. Watermelon : Sugar baby, Arka Jyothi
d. Cowpea : V-240, V-16, GC 82-7.

IV. High Range Region

Dr.K. Kumaran, Associate Director of Research presented the report. The lead functions of Regional Agricultural Research Station, Ambalavayal was revised as Pepper and Pepper based cropping till paddy, cool season vegetables, soil and water management and coffee based cropping system. The verification functions have been revised as essential oils, tree spices, medicinal plants and ginger. In Pampadumpara, Cardamom continued to be lead function. Pepper, tree spices and medicinal plants were the verification functions.

The following are the important Zonal package of recommendations:

(.....8/-)

1) New High Yielding Variety 'Edavaka'.
2) New Cardamom Variety : PV-1
3) Banana Variety : Bodler Altafort
4) Turmeric type : PTS - 9
5) Cabbage variety : September
6) Cauliflower vareity : Swathy
7) Tomato : Pusa Early Dwarf
8) Brinjal : Navaneeth
9) Dioscorea : DA-30

The following agrotechniques were standardised:

1. Fertilizer levels(N&K) for clove
2. Stone grafting for Mango
3. Optimum season for rooting laterals of black pepper
4. Cultivation of cardamom under artificial shade
5. Control of Azhukal disease of Cardamom
6. Control of bacterial wilt of ginger with soil trenching of Bordeaux Mixture
7. Control of the emergence of rhizone rot of Ginger using captan.
8. Rice followed by ginger in rice based farming system gave maximum returns.

v) PROBLEM ZONE

Dr. R.R. Nair, Associate Director of Research, presented the report. He briefly explained farming situations and the revised lead and varification functions.

The following recommendations were included in the Zonal package.

(i) Rice varieties with multiple resistance.

a) Pavizham

(....9/-)

b) Karthika

c) Makom

d) Remya

e) Kanakam

(ii) Timing application of fertilizer for rice.

(iii).

(a) Weed management by drainage of the field prior to seeding and spraying paraquat after weed germination followed by submergence and draining.

(b) Control of wild rice by calcium peroxide and sub mergence during germination.

(c) Control of grassy weeds using propanil and broad leaved weeds using 2-4-D.

(d) Biological control of Salvenia.

(iv) Integrated farming of

(a) Rice + Fish (Carps)

(b) Coconut + livestock + fish and

(c) Duck + fish in ponds

(v) Coconut

(i) Root wilt management package.

(ii) Inter cropping Cassava, Cocoa, grass and banana in coconut garden.

Pokkali Rice.

1) Salt tolerant varieties, Vyttila 1, 2 and 3 have included.

2) An N:P doze of 20:40:0 was standardised.

3) Integrated farming of Rice-prawn selection slicking.

Kole

1. Early duration rice cul.24-20, identified for drought prone areas.

2. Fertilizer dose revised as 90:35:45 for early and 110:45:45 for medium duration rice.

(.....10/-)

Onattukara

1. Photo sensitive medium duration varieties with more straw viz., Lakshmi and Dhanya and early varieties Onam and Bhagya were evolved.

2. Weed control in direct sown rice using Bhutechlor (1.25 kgm/ha)

Sesamum

1. Kayamkulam-1 and Thilothamma varieties of Sesamum were evolved for graining in rice followers in Onattukara region.

2. The irrigations are at 4-5 leaf stage and the other at flowering stage was optimum and economical.

Sugarcane

1. The varieties namely Madhuri and Thirumadhuram are tolerant to red rot were evolved.

The Chairman then invited questions/clarifications, if any from the delegates.

Dr. Gangopadhyay riased the following points.

1. Even though Kerala Agricultural University has released a good number of rice varieties the rice yield remains to be low in the state.

2. Similarly in the case of Coconut also the productivity is low.

He, therefore, suggested that it is necessary to give a new thought to the whole planning the future experiments. Emphasis should be given to farming systems rather than cropping system research.

Dr.Ghosh wanted to know the zonal station in Kerala Agricultural University identified for farming system in rice research.

(.....11/-)

The Director of Research replied that the Regional Agricultural Research Station, Kumarakom is identified as the Zonal station for conducting Farming system research.

Before winding up the discussions the Chairman thanked the Director of Research, Associate Directors of Kerala Agricultural University for their rice presentation and the delegates for their active participation in the discussions. The session came to a close at 1.45 P.M.

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NARP Southern Regional Meeting, 7-8 December, 1992

MINUTES

Technical Session II - Tamil Nadu

The Session commenced at 2.00 p.m. with Dr. M. Aravindakshan, Director of Research, Kerala Agricultural University in the Chair. Dr. R.R. Nair, Associate Director (Special Zone) and Dr. T. Radha, Associate Professor, Kerala Agricultural University monitored the proceedings.

Dr. S. Chelliah, Tamil Nadu Agricultural University, gave a brief account of activities of the University. Farming systems research has been in progress in three centres - Aduthurai, Bhavanisagar and Pattukollai with the financial support of Ford foundation. The University has also established an effective management information system. The absorption of funds under NARP has been cent percent.

Dr. A. Varma, Sr. Scientist, NARP, Project Directorate opined that in the farming system research, livestock should form an important, integral component.

Dr. Abdul Karim, Director, TNRRI, Aduthurai presented the location specific recommendations evolved for the Cauvery delta zone. Among the technologies, direct seeding under semidry rice cultivation system has attracted the attention of most of the farmers in the zone and almost 7 lakhs ha. of rice is under this system. Split application of potash and use of the green algae have been the other management practices to become popular.

Dr. S. Gangopadhyay, Principal Scientist NARP, ICAR deplored that technologies have not been generated based on agro-ecological situation. Dr. Chelliah assured that it would be taken care of in future.

Dr. S. Thangavelu, Professor & Head, R.R.S., Vrudhachalam, presented briefly the zonal package of practices recommendations. Nutrient requirements of many of the cropping systems have been worked out and popularised among farmers.

Dr. S.P. Ghosh, Project Director, NARP, suggested that farming system research should be given due importance while revising the lead and verification functions of this zone.

The zonal recommendations of N-W zone were presented by Dr. R. Rajagopalan, Professor & Head, RARS, Paiyur. One of the most important achievements of this zone is the release of a dwarf mango variety, Paiyur-1 which has all the traits of Neelam. A plant density of 400 trees ha. -1 is also recommended.

Dr. S.P. Ghosh, opined that if Paiyur 1 has a real dwarf architecture, it could be used in breeding programmes to evolve high yielding mango varieties.

Dr. Pothiraj, Professor and Head, RRS, Aruppukottai, gave a brief account of the new location specific technologies evolved. Improved goru and seed drill have become highly popular in the zone. Dr. S. Gangopathyay remarked that the zonal concept has not been adopted fully with too many lead functions.

The location specific recommendations for the western zone were presented by Dr. V.S. Shanmughasundaram, Professor and Head, ARS, Bhavanisagar. Specific technologies have been evolved for different cropping systems also. Dr. M. Aravindakshan, Director of Research, Kerala Agricultural University, suggested that the technology developed at RARS, Kumarakom should be adopted with modifications in rice-fish integrated systems developed in the zone.

The POP recommendations for the High Altitude Zone were presented by Dr. G.B. Peter, Professor & Head, HRS, Thadiyankudisai. Dr. M. Aravindakshan, Director of Research Kerala Agricultural University opined that specific work should be initiated on soil conservation.

Dr. Anjanam Azhakiya Pillai, Professor & Head, HRS, Pechiparai, gave a brief account of the work initiated in the High Rainfall zone. Dr. S.P. Ghosh, Project Director NARP, suggested that many of the technologies developed by KAU for similar situations could be tested and adopted, if found suitable. This would help reduce the research efforts in this zone.

The revised lead and verification functions of the Zonal stations under TNAU were presented and discussed.

The session came to a close at 4.00 pm.

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TECHNICAL SESSION III

The session was chaired by Dr. G.D. Radder, Director of Research, UAS, Dharwad. Dr. Santa Ram, Associate Director of Research gave a brief description of the lead and verification functions of the zones of APAU. He also informed the house that the package of practice recommendation for the various zones have been prepared. The seven different agro-climatic zones are

I. Krishna Godawary zone
II. North Coastal zone
III. Southern Zone
IV. Northern Telengana Zone
V. Southern Telengana Zone
VI. Scarce rainfall zone
VII. High altitutde and tribal areas zone

Rice is the major crop in which development of course and scented rice and also new outlook on pest and disease management becomes essential when minor pest/ disease becomes major. Reprioritization of various functions also become necessary with respect to changes in cropping and farming system, research on agro-forestry and fodder crops and exploitation of coastal area resources.

Zone I - Krishna Godawary Zone.

The report was presented by Dr. M. Rama Rao, Associate Director, RARS, Guntur. The important research highlights are-

Rice

1. Swarna, Sowbhagya, Vijayamashari, Lekshmi, Badaramashuri, Sona mashuri and Dhanyalekshmi (5 to 5.5 t/ha) were released.

2. Vajram and Pratibha developed resist BPH.

Pulses

a) Blackgram

1. Variety Krishnayya resist powdery mildew disease.

b) Greengram

1. Lam M-2 is a heavy yielder (18-20 q/ha)
2. LGG 407 - a pre-release culture, developed through mutation breeding, tolerates bacterial leaf spot and root rot.

c) Redgram

Abhaya is moderately resistant to Helicothis sp.

Cotton

Kanchara and LK-861 were recommended in white fly endemic areas.

Chillies

Knan, Aparna and LCA 235 were released, among which Kiran is tolerant to aphids.

Coriander

Swathy, Sadhana and Sindhu were released.

Betelvine

Decline disorder a major threat was corrected by sypsum (2.5 t/ha) application under improved drainage condition.

Cashew

Hybrid progenies BPP-1, BPP-2 and Selections BPP-3, 4, 5, 6, 7, 8 & 9 were brought out.

The lead and verification functions of the different research stations under the zone, viz. RARS, Lam, ARS, Moruteru, ARS, Ghenthasala, ARS, Darsi, water management scheme Gorikapada, ARS, Vijayarai and Rice Research Unit, Bapatla were rationalised

Zone II - North Coastal Zone

The report of the zone was presented by Dr. A Padmarajan, Associate Director, RARS, Anakkappalli. The main zonal package recommendations are as follows:-

Rice

1. For the rice-rice-fallow and fallow-rice-pulse system Swarna, Vajram, Krishnaveni, Cheitanya, MTU-2077 and Surekha are recommended.

2. Gall midge is a ssrious problem and tolerant varieties developed in Warangal are not useful in the tract since a new biotype of the pest is present. Tolerant varieties for the tract have been developed.

Sugarcane

Sugarcane is the crop next in importance to rice in the region. Short duration varieties developed at TNAU (9 months) are found useful.

Bajra

Hybrids MBH-110, MH-179, BK-160, Mallikarjuna, Visakha, KMS-7701 and ICTP-8203 are recommended.

Ragi

VZM-1, Sorada, Godawari, Ratnagiri and PR-1158-9 are recommended.

Jowar

Hybrids CSH-5, CSH-6 and CSH-9 and varieties CSV-4 and CSV-8 are recommended.

Groundnut

TPT-1, TPT-2 and TMV-2 (drought prone areas) and Kadri-3, ICGS-11 and JL-24 (areas of assured moisture) are recommended.

Sesamum

Two varieties viz. Gowri and Madhavi are recommended. Trials were conducted to develop white seeded gingely but the varieties developed do not withstand excess moisture.

Pulses

Greengram - ML-267, Pusa-105 and PDM-54 are recommended.

Blackgram - 7-9 and LBG-20 are recommended.

Redgram - LRG-30, ICPL-270 and ICPL-232 are recommended.

Package of practice developed for tapioca and mesta also. The tract is suitable for oilpalm cultivation. Recently the crop is gaining importance. Adaptive research started on National Watershed Management also.

In animal husbandry, the tract is suitable for sheep and goat farming. Fisheries development, has ample scope in the zone along the 400 km of the coastal belt. Prawn culture is very popular in the area. Rice-fish culture studies are being taken up. But in the above farmers are keen in increase concentration of fishes and finally giving up rice cultivation.

Zone III - SOUTHERN ZONE

The report of the zone was presented by Dr. A. Padma Ragam, Associate Director.

The revised lead and verification function of the various stations in the zone were explained briefly by him.

Rice: Simhapuri, Sreeranga and Swarnamakhi were released.

Groundnut

1. Kadiri-1, 2 and 3 were recommended for the zone.
2. K-150 gave highest yield (3150 kg) under irrigated condition.

3. Virginia bunch groundnut variety TPT-3 released from Tirupathi centre has high oil content (53%) and shelling percentage (76%).

4. Variety JL-24 identified superior for December first week sowing (rabi).

Sugarcane

CO-62175 recorded highest cane yield of 9.67 t/ha followed by COT-8201 (95.1 t/ha).

Pulses

Redgram variety MG-66 recorded the highest grain yield of 1236 kg in multilocation trial.

Finger millet

Short duration cultures PPR-2679 and PPR-2680 with 85 to 90 days and PPR-2614, a medium duration culture gave high grain yield of 31 q/ha.

Cropping system

1. In groundnut based cropping system under well irrigation highest economic yield of 10145 kg/ha was obtained in groundnut-rice-pearl millet followed by finger millet-maize-groundnut (9445 kg).

2. Sesame (510 kg/ha), pearl millet (1340 kg/ha) and groundnut (1820 kg/ha) are the better crops for sowing in early kharif (May-June).

When the presentation was over Dr. Ghosh opined that since each station in the southern zone is dealing with different crops how the NARP concept will fit into the pattern.

Dr. Padma Rajam explained that research on new crops has been initiated in all the station according to the priority of the area.

In reply to the question of Dr. Ghosh on the research-extension linkage in the zone, the Associate Director briefed the house about the periodical meetings of scientists, extension workers and farmers.

Zone IV - NORTHERN TELENGANA REGION

The report of the zone was presented by Dr.A. Shivaraj, Associate Director. Important research highlights and package ø recommendations for the region are:-

Rice

Gall midge resistant varieties Kakatiya, Divya, Pothana, Surekha and Kovya developed.

Maize

Hybrids DHM 101, DHM 103, DHM 105 and varieties Aswini and Madhuri were released.

Sugarcane

1. High yielding mid season (Co-7219 and CO-80017) and early maturing (CO-6007 and CO-8014) varieties were developed.
2. CO-8014 identified as drought tolerant.

Cotton

1. Variety Pawani and two short duration hybrids ADB G4-1 and ADB H-3 were developed.
2. Arborcum cotton variety Saraswathi was recommended for general cultivation.

Groundnut

High yielding cultivar JCG-38-2-1 developed.

Sesamum

White seeded variety Rajeswari developed.

Mustard was introduced as an oilseed crop in rabi season.

Turmeric

Rhizome rot tolerant varieties Saguna and Sadarsana were identified.

Research on mango, chillies and onion is conducted at the Horticultural Research Station, Mallyal donated by the former Vice-Chancellor Dr. S. Raghotham Reddy, Agricultural Research Station, Madhira is concentrating research on pulses.

Zone V - SOUTHERN TELENGANA ZONE

Dr. A. Rameswar, Associate Director presented the report of the zone. There are 19 farming situations identified in the region of which 12 are discussed.

Rice

1. Dwarf high yielding varieties Tella Hamsa, Rajendra and Satya suitable for cultivation in both kharif and rabi released.

2. Chendoa resistant to brown plant hopper was released.

Maize

Composite Aswini tolerant to stalk borer and varun resistant to drought were developed

Sorghum

Varieties SPV-462, SPV-475 and hybrid CSH-9 found promising for kharif season.

Bajra

Two synthetics viz. Mukhtha and Mallikarjuna maturing in 85-90 days with an yield potential of 20-25 q/ha and tolerant to downy mildew were developed.

Redgram

PRG-100 maturing in 130-140 days developed.

Horsegram

PHG-62 resistant to yellow mosaic virus developed.

Castor

1. Hybrid GCH-4 with high yield potential under irrigated condition also found to be tolerant to wilt and root rot.

2. Sowing along contour during end of June is recommended to conserve moisture.

3. Semi looper, a severe pest of castor has been managed by multiplication and application of its parasite.

Sunflower

APSH-11 hybrid developed from Agricultural Research Institute, Marden.

Safflower

Sagova Muthgalu and Manjira were developed.

Mango

Manjira, a dwarf stature, prolific bearing hybrid was developed.

Weed control

Application of glyphosate along with ammonium sulphate resulted in good control of Cyperus rotundus.

Initiating discussion on the report Dr. Ghosh commented that the farming situation are too many and are to be renowed down in order to implement the programme effectively.

Reacting to the findings of weed control trial Dr. Chelliah enquired about the role of ammonium sulphate in control of weeds. Dr. Rameswar explained that the

improved efficiency of slyphosate along with ammonium sulphate is due to the fact that it improves the penetration of the chemical into the tissues.

Dr. Gangopadhyaya suggested that since cyperus ~~bypasses~~ is a difficult to control ~~weed~~, the finding deserves special attention.

Zone VI - SCARCE RAINFALL ZONE

Dr. K. Venkata Raja, Associate Director presented the report of the zone.

Rice

MTU-5182 and 4870 identified tolerant to brown plant hopper which is a serious pest of the area.

Sorghum

NTJ-1 and NTJ-2 were released.

Redgram

LRG-30 and ICPL-270 are suited in black soils.

Groundnut

1. Application of FYM, Sypsum, iron and zinc increased pod yield.
2. The best time of sowing is July.
3. Application of saad improved surface penetration.

Mustard

'Seetha' variety of the introduced crop was found to be promising.

Sunflower

Second fortnight of July is ideal for sowing.

Dr. Gangopadhyay suggested that this being a drought prone area the groundnut though the variety TMV-L comes up well, 100% coverage with a single variety is not advisable due to obvious seasons.

Dr. Ghosh suggested that since drought is frequent in the tract, the recommendations of ICRISAT and Jodhpur Centre could be tried. He also emphasised the need for initiating research to identify an alternate crop to groundnut. He informed the house that in drought prone areas of Rajasthan, hardy tropical species of grams and deep rooted crops sustain and opined that trials may be initiated on the above lines.

ZONE VII - HIGH ALTITUDE AND TRIBAL AREA ZONE

Dr. Khader, Associate Director i/c, RARS, Chintapalli presented the report.

The zone having an area of about 20 lakh ha of which 58% is under forests and 18% only is under cultivation. The area is inhabited by 6.22 lakh tribal and they resort to shifting cultivation.

The major crops grown are rice, pulses, Raja bean, cowpea, ragi, redgram in steep a well as lower slopes. The slash and barn method which is followed consists of cutting down and burning all the plants and sowing mixtures of seeds of different crops during May. In addition in the valley wet land paddy is cultivated by preparing terraces and irrigated using hill streams.

In the homesteads vegetables like tomato, cabbage, cauliflower and delichos are raised. Other crops grown in the area include cashew, custard apple and minor plant crops.

Rice: RGL-2538 (6 t/ha) identified suitable. 20% of the area is at present covered by HYVs.

Wheat : Sagarica variety introduced in 1991 is accepted.

Maize

Aswini was found superior to other varieties.

Ragi

Godawari and Rahagiri are suitable.

Pigeon pea

ICPL-84052, a short duration ICRISAT variety is found ideal.

Tuber crops like Amorphophallus and Tapioca are grown in the area.

Ginger and turmeric are commonly cultivated crops which suffer from soft rot problem. The traditional method is only shifting cultivation. New approach for disease management are to be taken up.

Dr. Ghosh called on the scientists of the zone to the proceedings of the last workshop on tribal agriculture held at Chintapalli during last year. Since hill banana and tuber crops are ideal for the situation work on the above crops are to be initiated urgently. Soft rot management is another important aspect that needs attention. It is also necessary to study the shifting pattern of agriculture practised by the tribals. Since the tribal population is spread across parts of MP, AP and Orissa a meeting of concerned scientists to be convened at the extent in order to understand the problems and chalk out markable action programme by each team. Dr. Khader replied that a meeting of the scientists of the various regions of the 3 States was held and action is being taken.

Dr. Ghosh suggested that a farming system has to be identified in the zone for taking up further research. Dr. Khader replied that Palem Station has already been identified.

TECHNICAL SESSION V & VI

Chairman		Dr. G.D. Radder, Director of Research, UAS, Dharwad
		Dr. Hegde, Director of Research UAS Bangalore
Rapporteurs	:	Dr. K. Kumaran, Associate Director, KAU
		Dr. Jose Mathew, Assoc. Professor, KAU.

The first part of the session (Session V) was chaired by Dr. G.D. Radder, Director of Research, UAS Dharwad.

Dr. Hegde, Director of Research, UAS, Bangalore presented a brief account of the activities under NARP. He also narrated the problems faced by the University in the project implementation, in respect of civil works, purchase of equipment, inadequacy of research operating cost, recruitment of staff, replacement of vehicles etc.

The Project Director (NARP) and Asst. Director General have clarified that with regard to granting of incentives to the scientists working in remote stations the additional expenditure is to be met by the State Government and ~~the~~ ICAR has no objection to this. Director of Research TNAU has informed that his University is already extending this privilege. The project Director further added that in respect of replacement of vehicles etc. the University and the State Government should have to act on them. He also said that there is no harm in changing the periodicity of T&V Workshops according to the needs and relevance of all concerned.

Non-participation of the officials of Departments other than Agriculture and Horticulture in the T&V Workshops was also pointed out by many of the delegates.

(..2)

Dr. Ghosh emphasised the role of the Associate Directors in technology generation relating to their zones and advised the University to adhere to this concept of NARP.

Dr. M.A. Singlachar, UAS, Bangalore presented the revised lead and verification functions, package of practices recommendation, details of farming system research, etc. of all the zones under the University. The important recommendations are as follows:-

1. Technology generation for sericulture in the hill regions
2. Formulation of management practices for the Katte disease of cardamom
3. Evolution of paddy varieties for coastal regions
4. Development of water management practices for the Cauvery and Bhadra commands
5. Measures forthe control of animal parasites

The Session VI was chaired by Dr. Hegde, Director of Research, UAS, Bangalore.

Dr. G.D. Radder, Director of Research UAS, Dharwad presented the major activities and achievements relating to NARP. He requested the ICAR for the further continuation of the NARP. He also indicated lack of interest on the part of Extension Departments other than agriculture in the conduct of farm trials. Afterwards, the concerned ADRs of the different zones presented in detail the major POP recommendations, revised lead and verification functions research-extension linkage relating to the respective zones.

Major recommendations relating to the following aspects were presetned.

1. Development of promising varieties of cotton, paddy, vegetables, pulses, oilseeds, millets, fruits, forage crops etc.

2. Formulation of agro-techniques including irrigation and soil-water conservation for the different crops and cropping systems

3. Management of pest and diseases of important crops,

4. Identification of suitable tree species for agro-forestry systems,

5. Introduction of aquaculture particularly in areas affected by salinity and alkalinity problems.

6. Evolution of cross-bred cows.

7. Development of farm implements, and machinery.

8. Farming system research involving the crop, livestock and aquaculture components.

During the ensuing discussion, the project Director expressed his concern on the conversion in some of the States of Zonal Stations to Agrl. Colleges at the cost of research, in the context of the inadequate staff and infrastructure facilities available at many of the centres. The same feeling was expressed by the Directors of Research of State Agricultural Universities as well.

The Session came to a close at 8.30 PM.

TECHNICAL SESSION - VII

Administrative affairs, Financial matters, Civil Works etc.

Chairman : Dr. S.P. Ghosh, Project Director, ICAR.

All the SAUs are requested to report the progress of civil works as the reimbursement has to be made before March 31st 1993, even though it can go up to 30th June 1993. Avoid Sprdaic requests for financial allocations. The Chairman stressed the point that proper utilization of structures completed has to be assured and funds can be provided for Electric and water connections and also for furnishing the same, and for other was no further commitments. The Six monthly reports/requests must reach ICAR exactly by the middle of September.

Extension of time due to delayed start of NARP Phase II can be considered, if all the works are completed and claims received before March 1993. As regards NARP region at Pechiparai, TNAU, time extension up to October 1993 can be considered.

The proposal for procurement of equipments must reach ICAR before 31st December 1992. SAUs who have not utilised the total allocations are not eligible for further request, even for extension of time.

Allotment will be made for Basic Research, Computer facilities, Training and vehicles under supplementary grants, the main items identified under VIIIth plan period. Arrears in respect of UGC implementation cannot be sanctioned after the closure of NARP Phases.

Those who have to pay back the excess drawn, in 26 zones, must be adjusted back at the earliest possible and if not further claims cannot be entertained. The final audited accounts must be submitted urgently. It is also stressed that the NARP reports are not delayed under any circumstances. The World Bank is usually particular that, if allotted amount is not spent timely, no further provision can be considered. Hence, please book the expenditure as early as possible. The provisions made for computerisation must be expended before 31st March 1993.

The session concluded by 11.00 P.M.

Vote of thanks was given by Dr. M. S. Nair, Associate Director of Research Head quarters, Kerala Agricultural University. Dr. Gangopadhyay thanked all for arrangements and fruitful discussions.

LEAD AND VERIFICATION FUNCTIONS - EXISTING AND REVISED

1. KERALA AGRICULTURAL UNIVERSITY
2. TAMIL NADU AGRICULTURAL UNIVERSITY
3. ANDHRA PRADESH AGRICULTURAL UNIVERSITY
4. UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE
5. UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD

KERALA AGRICULTURAL UNIVERSITY

Research Programmes in Kerala (KAU)

Agro-climatic Zones/ Stations	Lead function	Verification	Modified Lead Function	Modified Verification Function
1	2	3	4	5
Northern Zone (Pilicode)	Farm implements, water management, coconut & Horticulture	Rice under water logging conditions	Coconut and coconut based farming system Agrometeorology, Waste land management Malabari goat.	Cashew, cucurbitaceous vegetables rice pickle, mango arecanut, agroforestry Banana
Sub-station: Panniyur	Agriculture horti-forestry	-	Pepper	-
Central Zone Pattambi	Rice, Laterite soil management, farming system, vegetables (River beds) farm implements PHT (Rice) & animal management	Tuber crops	Rice and rice based farming systems, pulses, seed technology, organic, farming of rice	Vegetables in rice fallows, animal management, Agroforestry, crop weather modelling, mechanisation in rice culture and fruits.
Sub-stations: Mannuthy	-	Rice	Rice for Role land management system, rice, coconut	Vegetables and organic farming research
Eruthempathy	Rice, groundnut	Paddy, pulses coconut	-	-

1	2	3	4	5
Kannara/Madakkathara	Horticulture & PHT of fruits & vegetables	-	Banana & banana based farming systems	Vegetables
Chalakudy	On farm water	-	Water management for rice & rice based farming system and other crops	Agro-techniques in rice and rice based cropping system
Southern Zone (Vellayani)	Tapioca and other tuber crops, vegetables water management, (drainage & recycling)	Rice based farming system and homestead farming	Research under partially shaded condition export oriented vegetables cut-flowers production	Rice fruits, homestead farming, coconut, tuber vegetables, farm machinery for garden land
Sub-station: Kottarakkara	Homestead gardening, horticulture & agroforestry	-	Homestead farming, soil & water conservation and management	Tuber, coconut, rice horticulture, Agroforestry, cashew
Problem Areas Zone (Kumarakom)	Mixed farming, coconut with management of acid saline soils, farm implements, horticulture integrated pest management	-	Integrated farming	Rice in kayal lands root (wilt) management homestead farming in Kuttanad
Sub-stations: Moncompu	Rice breeding plant protection of rice in Kuttanad area	-	Rice in Kuttanad	-

1	2	3	4	5
Kayamkulam	Rice, water management	Irrigation management of light soils rice	Rice in Onattukara annual oil seeds and pulses	Vegetables, cassava in homestead mushroom
Vyttila	Aquaculture	Fisheries & rice prawn culture	-	-
Thiruvalla	Sugarcane, vegetables	-	-	-
High altitude Zone (Ambalavayal)	Citrus (mandarine oranges), mango pomegranate, hill paddy based farming system. Vegetables, horticulture, arid horti-forestry and water management	Pepper, essential oil and medicinal plants	Pepper and pepper based farming in high ranges, hill paddy, cool season vegetables, soil and water management, sub-tropical fruits, tree spices, coffee based cropping system	Essential oils and medicinal plants ginger.
Sub-station: Pampadumpara	Cardamom, Post-harvest (curing of cardamom) & shade regulation studies	Pepper and hill rice	Cardamom	Pepper, tree spices, medicinal plants.

TAMIL NADU AGRICULTURAL UNIVERSITY

RESEARCH PROGRAMMES IN AGRO-CLIMATIC ZONES

State / University : Tamil Nadu / Tamil Nadu Agricultural University

Format for sending Existing and Modified/Addition in Lead and Verification functions

SAU/Zone/Sub-station wise

Agro-climatic zones (Zonal Stations)	Existing		Modification / Addition	
	Lead function	Verification function	Lead function	Verification function
(1)	(2)	(3)	(4)	(5)
i) CAUVERY DELTA ZONE				
a) Aduthurai	Rice and rice based cropping systems specially pulses and oilseeds, mixed farming.	-	Research on rice fallow soyabean, cotton, mixed farming, Post harvest techniques on quality	ORP and OFT
b) Sub-Station-Kattuthottam	On farm research on water management (Canal command)	-	On farm research on Water management (Canal command)	1. Development of suitable alternative cropping systems to meet the contingencies of different water supply conditions and inadequate water supply for both old and new delta areas. 2. Assessment, monitoring and evaluation of improved water management practices so as to minimise conveyance and distribution losses and to maximise water use efficiency.

1	2	3	4	5
				3. Developing suitable technology for conjunctive use of ground and surface water for delayed and inadequate supply of water in the canals as well as for maintenance of optimum water balance for different rice-based cropping system. 4. Economizing water consumption and increasing fertiliser use efficiency by optimum combination of irrigation water and fertilizer levels. 5. Development of suitable drainage systems to overcome problems of ill-drained condition and consequent low yield of rice. 6. Evaluation and management of different components of water balance equation under major rice-based cropping system. 7. Study of soil conditions under different water regimes and effect of amendments for soil improvement. 8. On-farm water management research for testing the field efficiency of improved

cont...

1	2	3	4	5
				water management practices including alternate cropping systems.
c) Pudukkottai	-	Testing of findings on paddy, millet, oilseeds & pulses.	Pulses improvement with reference to redgram, blackgram and greengram.	To verify the suitability of strains of horsegram, Cowpea and millets (Ragi and Cholam)
d) Sirugamani	Sugarcane	-	Research on sugarcane and wetland banana	Test verification of newly released varieties of sugarcane and banana.
ii) NORTH WESTERN ZONE :				
Paiyur	Crop technology for rice, ragi, cowpea, redgram, cotton, agrl.implements, horticulture.	-	Ragi and Horsegram improvement	Testing of improved cultures of Paddy, Cholam, Cumbu, Samai, Varagu, Tenai, Kudiraivali, Panivaragu, Groundnut, Gingelly, Sunflower, Niger, Soyabean, Mustard, Castor, Blackgram, Cowpea, Tomato, Cluster beans, Beans, Jasmine, Chillies, Tapioca, Mango, Forages and Legumes.

1	2	3	4	5
Sub-station -				
Namakkal	Tapioca, poultry nutrition and management.	-	Research in poultry and Tapioca.	Test verification of 1) Crop improvement & management techniques. ii) Poultry management techniques.
Sub-station -				
Pottaneri	Sheep breeding and pasture development rainfed tomato and cucurbetacaous vegetables.	-	Research on Sheep nutrition and management. Improvement of rainfed vegetables especially tomato and cucurbits.	Breeds/Varieties and management techniques developed elsewhere are evaluated based on the needs of the sub-zone.
NORTH EASTERN ZONE :				
Vridhachalam	Groundnut, gingelly, oilseeds based cropping system, dryland technology for red soils.	-	-	Test verification of the oil seed varieties in the Zone. Test verification the Cropping System and dryland technology developed.

1	2	3	4	5
Sub-Stations				
a) Tindivanam	Rainfed groundnut	-	-	Test verification of the groundnut cultures suitable for rainfed conditions.
b) Kattupakkam	Mixed farming with Dairy, Piggery, Poultry and sheep.	-	Nutrition and buffalo management	-
c) Cuddalore	Sugarcane	-	-	Test verification of the newly released sugarcane varieties.
d) Vellore	Banana, brinjal, water management under well irrigation.	-	i) Improvement of Horticultural and Vegetable crops. ii) Production technologies for Horticultural crops and field crops. iii) Studies on Weed management and Water management for various field crops. iv) Studies on the amelioration of tannery pollution in North Arcot Ambedkar District. v) Studies on Pest and disease management.	Multilocation trials with improved genotypes of various field crops as well as production technologies.

1	2	3	4	5
Sub-Stations				
a) Tindivanam	Rainfed groundnut	-	-	Test verification of the groundnut cultures suitable for rainfed conditions.
b) Kattupakkam	Mixed farming with Dairy, Piggery, Poultry and sheep.	-	Nutrition and buffalo management	-
c) Cuddalore	Sugarcane	-	-	Test verification of the newly released sugarcane varieties.
d) Vellore	Banana, brinjal, water management under well irrigation.	-	i) Improvement of Horticultural and Vegetable crops. ii) Production technologies for Horticultural crops and field crops. iii) Studies on Weed management and Water management for various field crops. iv) Studies on the amelioration of tannery pollution in North Arcot Ambedkar District. v) Studies on Pest and disease management.	Multilocation trials with improved genotypes of various field crops as well as production technologies.

1	2	3	4	5
			5. Biological control of pests like scale, aphids, stem borer etc., on mandarin 6. Collection and evaluation of bush beans (local and exotic) for adaptability to rainfed cultivation in hilly zone and for dual purpose for use as green-pods and dried grain. 7. Studies on optimum time of planting, spacing and manurial requirements (including biofertilizers) of promising bush bean varieties 8. Management of pests and diseases, aphids, root grubs, wilt, anthrecnose, root rot and mosaic in beans.	
b) Sandynallah	Sheep, poultry, rabbits & pasture development	--	--	--
c) Vijayanagaram	Pest management of temperate vegetables and fruits.	--	To develop suitable varieties for hill vegetables. To develop production and protection technologies for hill vegetables.	Test verifying the technologies developed from other hill zones of Tamil Nadu

1	2	3	4	5
HIGH RAIN FALL ZONE :				
Pechiparai	Pepper, nutmeg, clove, cinnnamon, multi-tier croppi- ng system with spices, tapioca, horsegram, banana, mango, pineapple, jack fruit tree sps. tapioca, vegetables and agroforestry.	Groundnut, blackgram, Sunflower.	To establish a Horti- cultural Research Station at Pechiparai in the High rainfall region and Rice research Station at Thirupathisaram. To conduct research on banana, mango, pineapple, jack, tree spices, nutmeg, rubber, tapioca, vegetables, Water mana- gement, Agro-forestry, rice and coconut. Research on mixed farming involving fisheries, poultry and piggery.	1. Evaluation of germplasm in vegetables. 2. Identification of suitable brinjal varieties for High Rainfall Zone. 3. Fixing fertilizer schedule for tapioca, banana, pineapple and other crops, including biofertilizers. 4. Standardising agronomic requirements of various Horticultural crops. 5. Evolving techniques for minimising spike shedding in pepper. 6. Weed management studies in Horticultural and Plantation crops. 7. To identify suitable Agro-forestry practices for High Rainfall Zone. 8. Identifying suitable indegenous and exotic tree spices for integrated farming system for Kanya- kumari District.

cont..

1	2	3	4	5
				9. Identifying suitable control measure for major pests and diseases of various Horticultural crops.
Sub-stations				
a) Tirupathisaram/ Kanyakumari	Rice, fish seed research, composite and management, water management, integrated farming system and off season mango.	--	Fisheries and animal science research. Research on composite fish culture Integrated farming and fish seed production.	1. To establish fish seed research and production centre to meet the much felt needs of quality fish seeds in the Southern districts of Tamil Nadu, particularly the Kanyakumari district. 2. Evolving appropriate, location specific nursery management techniques and practices, suitable to this zone to achieve survival rates and yields. 3. Evolving suitable species ratios and stocking densities in composite fish farming for the agro-climatic conditions of Kanyakumari district. 4. Evolving suitable integrated farming system involving livestocks (small animals like Tellicherry goats, pigs, poultry and ducks) and crops to reduce the cost of fish production and to increase the rate of return.

cont...

1	2	3	4	5
				5. Undertaking on-farm trials and to impart training to selected fish farmers on various aspects of fish farming and integrated farming to facilitate transfer of technology packages to the user groups.
SOUTHERN ZONE :				
Aruppukottai	Dry farming technology of black and medium red soils.	Cholam, pulses, bajra, cotton, oilseed	Research on water-management (Tank fed), farm implements, mixed farming (Sheep, goat, poultry) - Coriander.	1. Development of suitable cropping system to suit different storage condition in the tank. 2. On farm water management research for testing the field application and operational efficiency through organised distribution of water. 3. Field evaluation of improved farm implements and tools. 4. Identification of constraints relevant to rainfed red and black soils in working implements and making necessary modifications. 5. Industrial extension of farm implements. 6. Evolving improved millet based cropping system along with animal husbandry for marginal farmers.

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1	2	3	4	5
				7. Survey, collection, maintenance and evaluation of coriander germplasm. 8. Post-harvest technology including processing and preservation of seed, products and extraction of oil. 9. Standardization of agro-techniques including spacing and manuring for maximisation of yields.
Sub-Stations: a) Koilpatti	Hybrid cotton & millet for rainfed areas.	--	--	Test verification of the hybrids developed in this Zone (cotton & millets) that too under rainfed conditions.
b) Vamban	Redgram, blackgram, greengram	Horsegram, Cowpea, millets	--	Test verification of new varieties developed on horsegram, Cowpea and millets in this Zone.
c) Srivilli-puthur	Irrigated summer cotton	--	Palmyrah improvement Research on breeding and nursery practices in Palmyrah cultivation and study on collection, preservation and product making of various palmyrah products.	Test verification of the findings.

1	2	3	4	5
d) Pudukkottai	Rainfed agro-forestry	--	Pulses improvement with reference to redgram, blackgram and greengram.	To verify the suitability of strains of horsegram, cowpea and millets (Ragi and Cholam).
e) Killikulam	On farm research on water-management (canal command)	--	--	---
WESTERN ZONE :				
Bhavanisagar	Farm implements, turmeric, tobacco.	---	Research on turmeric and tobacco.	Test verification of Crop improvement and Crop Management results under field conditions. Dissemination of important findings through extension agencies.
Sub-Stations :				
a) Mettupalayam	Agro-forestry	--	Research on Agro-forestry. 1. Survey of present status of agroforestry system including agronomic and economic aspects.	Test verification of the finding in the farm of On-farm trials in the farmers holdings.

1	2	3	4	5
			2. Indepth case studies on socio economic aspects of farmers practicising agroforestry. 3. Identification of tree species capable of (a) multiple and uses (fuel, wood, timber, soft wood, fodder, manure, medicinal and aromatic value, oil, edible fruit/seed etc. (b) Fast growth rate (c) having desirable agronomic traits (minimum crown spread, root spread, water requirement and less prone to harbour pests and diseases. 4. Identification of most compatible combinations of parennial and annual cross with maximum tolerance to shading effect and root competition with maximum productivity and economic returns of the systems as a whole. 5. Optimum spacings, plant geometry indices for important tree species suitable for agroforestry.	

cont...

1	2	3	4	5
			6. Development of soil suitability indices for important tree species suitable for agroforestry.	
			7. Development of suitable methods of propagation (sowing/planting), soil working, weeding, etc. for successful establishment and production under different agroforestry systems.	
			8. Determination of suitable practices for fertiliser and irrigation application in different agroforestry systems.	
			9. Root development of different constituent crop plants in agroforestry systems and interaction of root systems (annual crop vis-a-vis perennial crops) in relation to the growth and production of constituent crops.	
			10. Light regime and its effect on the growth of associated herbaceous vegetation (both annual crop plants and weeds)	
			11. Assessment of Evapotranspiration and consumptive use of water under different combinations of agroforestry systems.	

cont...

1	2	3	4	5
			12. Nutrient balance including organic matter addition and cycling of plant nutrients under different agroforestry systems.	
b) Periyakulam	Horticultural crops	---	Research with major emphasis on sapota, mango, jack, tamarind, citrus, vegetables, onion, chillies and flower crops	Test verification of improved cultures of fruits and vegetables.

ANDHRA PRADESH AGRICULTURAL UNIVERSITY

FUTURE MAIN AND VERIFICATION FUNCTIONS AT VARIOUS RESEARCH STATIONS IN THE AGRO-CLIMATIC ZONES OF APAU.

Res. Station	Functions	
	Main	Verification
1	2	3
I. KRISHNA-GODAVARI ZONE		
R.A.R.S., Lam	Pulses, Cotton, Chillies, Coriander, Soybean and minor millets Regl.Res.Units Soil Science, Physiology, Plant Pathology, Entomology, Heliothis Management, Hybrid Cotton.	Mustard, Castor, Gingelly, Mushroom spawn production, Farming systems research, Forage sorghum
ARS, Maruteru	Rice, Rice based farming system, Soil & Water management of delta soils, Post-harvest Technology (Rice), Rice-cum-fish farming.	Summer pulses
ARS, Ghantasala	Rice fallow pulses (rabi and summer)	Rice in kharif
Bacterial inoculants Unit, Amaravati	Rhizobium culture production	Hybrid cotton
ARS, Darsi	Crops and cropping systems for NSP right canal oil-seeds, millets, Agro-forestry, Soil & water management	Pulses
Water Management Scheme, Garikapadu	Crops and cropping systems, Water management for NSP Left canal.	Rice, Pulses, Soybean, Groundnut
ARS, Vijayarai	Oilpalm, watermanagement for horticulture crops, Melons Cropping systems and Cropping models in fruit crops & research on vegetables including off-season vegetables	Pepper, clove, Cinnamomon, cocoa, Sericulture
Rice Res.Unit, Bapatla	Rice (Krishna-western delta and NSP black soils)	Rice based cropping system
Cashew Research station, Bapatla	Cashewnut	Cashew based cropping system - Inter cropping
Weed control scheme, Bapatla	Integrated weed management of crops	Control of weeds in rice fallow pulses.
Post-harvest Technology Centre, Bapatla	Post-harvest technology of rice, pulses and groundnut Farm implements and machinery	

1	2	3
Agril.Research Station Chintalapudi	Betelvine	Management of betelvine malady of unknown etiology
Seed Prodn. Farm Venkataramannagudem	Seed production (upland and light irrigated crops)	
Seed production Farm, Jangamaheswarapuram	Seed Production in rice, soybean, cotton	Soybean, cotton
A.R.S.,Pulla	Rice for deep water and flood situations	
A.R.S.,Machilipatnam	Rice for saline soils	
AICRP on Agril.Drainage, Yendakuduru	Agricultural Drainage for low land rice and other irrigated crops in delta lands	
A.R.S.,Vuyyuru	Sugarcane	Sugarcane based cropping system (Rice, Pulses)
A.R.S.,Ambajipeta	Coconut, Arecanut, Coconut based (multi-tier cropping system)	Parasite breeding
A.R.S., Kovvur	Banana, Tuber crops, other than Potato	Turmeric
II. NORTH COASTAL ZONE		
RARS, Anakapalle	Sugarcane and Sugarcane based cropping systems	Oilseeds and millets
ARS, Amadalavalasa	Mesta and Mesta based cropping system	Oilseeds and pulses
ARS, Ragolu	Rice and rice based cropping systems, technology for tankfed areas	Oilseeds
ARS, Vizianagaram	Ragi, Pearl-millet	Oilseeds and Pulses
ARS, Yelamanchili	Sesamum	Groundnut, sunflower
ARS, Peddapuram	Ragi and Tapioca	Pulses, Oilseeds, Millets
L.R.S.,Garividi	Composite Livestock research	Sheep, goats, pigs and livestock based cropping system

Contd...

1	2	3
	New centres proposed to be established	
1) Bobbili	Rainfed sugarcane	
2) Naira (College Farm)	Oilseeds (groundnut, sunflower, soybean, mustard), Horticultural crops	Pulses
III. SOUTHERN ZONE		
RARS, Tirupati	Groundnut and groundnut based cropping systems, water management	Vegetables and floriculture (Dept. of Horti., SVAC), Pulses, Watershed management, fodders.
ARS, Perumallapalle	Sugarcane, Millets	Rice and rice based cropping systems, fodders
ARS, Kadiri	Groundnut and groundnut based cropping systems,	Sunflower
ARS, Nellore	Rice and rice based cropping systems, Tankfed cropping systems	Rice fallows cotton, groundnut, pulses, sugarcane
ARS, Kavali	Agro-forestry, Progeny orchard-cum-nursery for citrus, mango, sapota, guava.	Pulses and Oilseeds
ARS, Podalakur	Sorghum based cropping systems, pulses, fodder jowar	Chillies, Oilseeds (castor, sunflower, soybean), soil management
ARS, Utukur	Rice based cropping systems, Water management, melons, gourds & cucumbers.	Oilseeds and pulses
ARS, Anantarajupet	Horticultural crops Mango, Papaya, guava and sapota, water melon, onion and garlic, banana, PHT of fruits and vegetables, betelvine	Leguminous Vegetables
ARS, Petlur	Citrus	Citrus based cropping systems
LRS, Palamaner	Sheep, Goat and Punganur cattle, Fodders	Agro-forestry, Sericulture, watershed management, millets, rice for cold tolerance sub-tropical fruits
IV. NORTH TELANGANA ZONE		
RARS, Jagtial	Rice, groundnut, sesamum, turmeric, water management, cropping systems and watershed management, on-farm research on sweet oranges research for tankfed and irrigated areas.	Pulses, cotton, mustard, sunflower, maize, rajma

1	2	3
ARS, Karimnagar	Maize, On-farm research on water management	Oilseeds and pulses
ARS, Warangal	Rice, Pulses, water management	Cotton (irrigated) Oilseeds
JVR HRS, Malyal	Mango, Chillies (irrigated) onion, garlic	Groundnut
ARS, Wyra	Rice based cropping systems. Seed production	Oilseeds and Pulses in rice fallows
ARS, Madhira	Pulses, Maghi jowar	Jowar, Cotton, Chillies
Horti.Res.Stn., Aswaraopet	Vegetables (tubers and beans) for tribals, minor forest produce, banana	Oilpalm, Oilseeds, pulses
ARS, Adilabad	Cotton, jowar, rainfed rice	Pulses, Watershed management
ARS, Mudhol	Rainfed cotton	Jowar, chillies, Sesame
Horti.Res.Stn., Bellampally	To be closed	
Regl.Sugarcane & Rice Res.Station Rudrur	Sugarcane, rice crops and cropping systems for Nizamsagar area	Oilseeds, Pulses, Onfarm research on turmeric
Fisheries Research station, Palair	Fisheries	
V. SOUTHERN TELANGANA ZONE		
RARS, Palem	Sorghum, bajra, castor, horsegram, fodder crops	Ragi, groundnut, greengram, blackgram, rainfed cotton, rice based cropping systems, research for tankfed and well irrigated areas
ARS, Tandur	Safflower and rabi sorghum, redgram	Oilseeds and Pulses
Maize Res.Stn., Amberpet	Maize, maize based cropping systems, Fodder maize	Fodder sorghum
ARI, R'nagar	Tissue culture, Floriculture, grapes, vegetables, agroforestry, PHT of fruits and vegetables, rice and rice based cropping systems, soil science & Agril.Chemistry, sunflower, Agril.implements, ornithology, Dryland horticulture (black soils)	Oilseeds and Pulses
F.R.S., Sangareddy:	Mango, guava, sapota, anona, PHT fruits	
ARS, Hallepalli	Dryland horticulture, cucumbers	Castor, jowar, Oilseeds, pulses, sweet orange (on-farm research)

1	2	3
VI. SCARCE RAINFALL ZONE		
RARS, Nandyal	Rice and rice based cropping systems, setaria, groundnut, sunflower, bengalgram, tobacco, jowar, cotton, water management, fodders, watershed management, seed production technology	Vegetables, onions, coriander, chillies, mustard, soybean, redgr safflower, farming syste s research (with sheep, goat and dairy) sericulture
ARS, Anantapur	Dry farming, groundnut based cropping systems, arid fruits pulses, fodders, implements, watershed management on red soils, farming systems research	Jowar, bajra, setaria, horsegram, groundnut, field bean, pulses
ARS, Reddipalli	Water management, cropping systems for HLC	Pulses, groundnut, sunflower, chillies, citrus & sericulture
VII. HIGH ALTITUDE AND TRIBAL AREA ZONE		
RARS, Chintapalli	Rice, cereals, millets, pulses, fruits, lead centre for niger for the entire state, vegetables particularly rajma, lima bean, spices and condiments, floriculture, agroforestry, watershed management, podu cultivation colecrops, seed production of cole crops, fodders, Pepper, agricul ure implements, storage structures	Oilseeds, sericulture, white burley, tobacco, farming systems, on-farm research on citrus, other fruit crops, turmeric, ginger pine apple, cereals, millets, pulses, oilseeds for tribal areas.
ARS, Pandirimamidi	Horticultural crops, particularly tamarind, cashew, custard apple, minor forest produce	
ARS, Seethampet	Rice, rice based cropping systems, agro-forestry, fodders	Millets, pulses and oilseeds.

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ZONE-4 : CENTRAL DRY ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. ARS, Arsikere	Strengthening of Coconut Research and Post-harvest technology as well as Training to the farmers and extension workers.	Testing and verification trials on Ragi, Mustard, Bengalgram and Soybean.
2. ARS, Tiptur	a) Animal Nutrition and Management by utilising locally available agro-forestry byproducts.	a) Verification and testing functions for Ragi, Horsegram and Jowar.
	b) Animal Management by parasitic control.	b) Developing Agronomic practices of major crops of the zone.
	c) Agronomic practice for soil and moisture conservation and crop production technology on watershed basis.	c) Testing of Agro-forestry systems for their economic viability.
	d) Crop improvement in groundnut and horsegram.	
	e) Introduction and evaluation of Fodder crops for the region.	
3. ARS, Hiriyur	- Soil and water management in V.V. Sagar command - Development of rabi sorghum - Cropping system	Identifying suitable cotton variety for the region and to generate information on its fertilizer requirement, seed rate, spacing etc.

ZONE-4 : CENTRAL DRY ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. ARS, Arsikere	No revision	Niger, groundnut, caster
2. RRS, Tiptur	Kharif sorghum can be taken up.	No revision
3. ARS, Hiriyur	No revision	Water management, Rabi sorghum, Safflower, Sunflower, Bengalgram and Groundnut.

ZONE-5 : EASTERN DRY ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. ARS, Chintamani	Research on dryland horticulture (Mango, Tamarind, Cashew, Pomagranate, Anola etc.) harvest and post-harvest technology and agro-forestry.	Rainfed crops and cropping systems.

ZONE-5 : EASTERN DRY ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. ARS, Chintamani	No revision	Oil seeds and pulses

ZONE-6 : SOUTHERN DRY ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. RRS, Mandya	a) Water Management b) Inland Fisheries/mixed farming c) Strengthening of sugarcane, rice, ragi and maize research	Testing and verification trials on pulses, oilseeds, maize, minor millet and fodder, besides agricultural technology.
2. ARS, Nagenahalli	a) Research on Banana and Maize b) Paddy seed production	Vegetable and oilseed production.
3. ARS, Madenur	Research on rainfed vegetables like tomato, brinjal, chillies and potato	Verification of field crop research
4. ARS, Nagamangala	Animal Nutrition and Management, Dryland farming.	Crop varieties for dryland

ZONE-6 : SOUTHERN DRY ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. RRS, Mandya	Hybrid rice and work on Horticulture needs to be initiated and strengthened.	Work on Poultry, Dairy, Rabbits, Sericulture and Apiculture.
2. ARS Nagena-halli	Research on high value hort. crops like venilla, pepper etc.	Establishment of tissue culture unit to supply disease free plants of sorghum and banana.
3. ARS, Madenur	Dryland horticulture - potato	Kharif pulses and oilseeds.
4. ARS, Nagamangala	No change at present.	-

ZONE-7 : SOUTHERN TRANSITION ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. RRS, Navile	ECV Tobacco, Rainfed Cropping systems, Farm Implements.	Finger millet, Sunflower, Groundnut, Redgram & Farm Forestry.
2. ARS, Honnaville	-	Cotton, Rice, Pulses, Oilseeds, and Weed Control.
3. ARS, Kathalagere	Irrigated cropping systems, Water management. Horticulture-Banana	Pulses, Sugarcane, Sunflower, Rice and Groundnut (Irrigated).
4. ARS, Kandali	-	Research on Finger millet.

ZONE-7 : SOUTHERN TRANSITION ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. RRS, Navile	Rainfed cropping systems, Fluecured Verginia tobacco, Farm implements.	Finger millet, rainfed cotton, groundnut, pulses, minor oilseeds, chilli, watershed management, Bio-fertilizers, mango, energy plantation and fodder crops.
2. ARS, Honnaville	Rice (Canal irrigated), Rice - Tankfed drill sown, & Rainfed cotton.	Sugarcane, summer groundnut, cropping systems under irrigation, ginger Fingermillet, rainfed cropping systems, redgram & fodder crops.
3. ARS, Kathalagere	Water Management, banana and Irrigated cropping systems.	Rice (canal irrigated), sugarcane, hybrid maize, Cotton (irrigated), pulses, sunflower, fodder crops, coconut, oil palm & Inland fisheries.
4. ARS, Kandali	-	-

ZONE-9 : HILLY ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. RRS, Mudigere	Plantation crops, spices, betelvine, hill paddy, agro-forestry, horticultural based systems, fisheries.	Pulses, maize and rice farming systems.
2. ARS, Ponnampet	Piggery (nutrition and management)	Hill paddy and rice blast work.

ZONE-9 : HILLY ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. RRS, Mudigere	Paddy, cardamom, arecanut, pepper and cropping systems.	Citrus, banana, jack, turmeric and minor fruits.
2. ARS, Ponnampet	Piggery	Paddy blast, rice and pepper based cropping systems.

ZONE-10 : COASTAL ZONE - EXISTING FUNCTIONS

Station	Lead functions	Verification functions
1. RRS, Brahmavar	Coastal farming systems, soil and water management and plant protection.	Paddy, pulses and oilseeds.
2. ARS, Kankanady	-	Paddy and pulses
3. ARS, Ullal	Cashewnut and tuber crops	Pepper and cocoa

ZONE-10 : COASTAL ZONE - MODIFIED FUNCTIONS SUGGESTED

Station	Lead functions	Verification functions
1. RRS, Brahmavar	Coastal farming systems, soil and water management, plant protection and integrated farming approach in fisheries with agricultural, horticultural and other wastes.	Paddy, pulses, oilseeds, sugarcane and horticultural crops. Agricultural implements, sericulture and forage crops.
2. ARS, Kankanady	-	Paddy, pulses and oilseeds.
3. ARS, Ullal	Cashew	Sweet potato and cassava Plant propagation by tissue culture.

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Research Programmes in Agro-climatic Zones of Karnataka/UAS(Northern Dry Zone)

Agro-climatic Zones (Zonal Stations)	Lead Function	Verification Function	Modicifation / Addition Lead	Verification
1	2	3	4	5
Dharwar	Dry farming, rabi jower saflower	Groundnut farm forestry farm implements	-	-
Sub-station, Gangavati	Management of salt affected soil & Sugarcane	-	Management of irrigated saline soils	-
Sub-station, Arabhavi	Animal nutrition on farm water management	-	Animal Nutrition and on farm irrigation water management	-
Sub-station, Siruguppa	On farm water management (Paddy)	-	On farm water management and paddy	-
Sub-station, Hagari	Sericulture,rainfed cotton	-	Sericulture, rainfed cotton	-
Northern East Dry Zone (Raichur)	Pulses, greengram, blackgram cotton, fruit crops,inland Fisheries.	Redgram oilseeds	Inland fisheries horticulture and cotton	-
Sub-stations i) Gulbarga	Pulses	-	Pulses and bajra	-
ii) Bidar	Soil & water management crop improvement, cropping pattern sugarcane sericulture.	Sugarcane	Animal nutrition Sugarcane sericulture	-
Northern Transition Zone (Hanumanamati)	Farming system & watershed management at micro level	-	Farming system and watershed management Krishi Vigyan Kendra	-

Contd.....

1	2	3	4	5
Sub-stations: a) Balgaun	Vegetable crops	-	Vegetable crops	-
b) Nippani	Tobacco	-	Bidi tobacco,maize	-
c) Mugad	Paddy based cropping system	-	Paddy based cropping system	-
d) Sandeshwar	Sugarcane & Chillies	-	Sugarcane, chilli & groundnut	-
Hill Zone(Sirsi)	Horticulture & rice based farming system	-	Rice based farming system and horti-cultural crops.	-
Coastal Zone(Ankola)	Cashewnut & prawn culture	-	Cashewnut and prawn culture	-
North East Transition Zone(Bidar)	Animal nutrition, sugarcane sericulture	-	Animal nutrition, sugarcane sericulture	-

ZONE-SPECIFIC PACKAGE OF PRACTICES

1. KERALA AGRICULTURAL UNIVERSITY

2. TAMIL NADU AGRICULTURAL UNIVERSITY

3. ANDHRA PRADESH AGRICULTURAL UNIVERSITY

4. UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE

5. UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD

(See Annexure)

R E S E A R C H - E X T E N S I O N

L I N K A G E

Session IV

RESEARCH-EXTENSION LINKAGE

- Complicated . . . Delicate . . .

- Why?

  Role of Research / Extension functionaries
  - Increase productivity
  - Contingency plans
  - Ensure attractive returns to the farmers

  Effective linkage helps:
  - To obtain realistic problems to work on
  - To successfully conclude the technology generation process
  - To aid in the dissemination/diffusion of technology generated

- Types:

  Intra-zonal
  Inter-zonal (Intra-state, Inter-state
  International ?)

- Linkages existing:

  Research - Research linkage
  (Inter-disciplinary, Inter-Institutional)

  Research - Extension linkage

  [Research - DOA/DOAH/DOF]
  - T & V, ZREAC
  - Training programmes
  - Seminars/Symposia
  - Pilot projects

  [Research - KVKs (NGOs)]
  - ZREAC
  - Training programmes
  - Seminars/Symposia
  - Pilot projects

  [Research - Extension- Farmer]
  - Diagnostic Teams
  - On-farm research
  - On-farm trails
  - Adaptive trials
  - Operational research
  - Demonstrations
  - Group discussions
  - Kissan Melas/Exhibitions

  Research - Industry

For success:

Opportunity

Matching structural set up

e.g. 1. Kerala	DCA	KAU
	Districts	Zones
	Jt. Dir	ADR
2. Haryana	DOA	HAU
	Districts	
	DDA	
	Zones	Zones
	Jt. Dir	ADR
3. Ideal ?		
	DCA	SAU
	Districts	
	JDA	
	Zones	Zones
	Addl. Dir	ADR

Willingness (Mutual, Subjective)

Problems - Solve then and there !

CONCLUSION

Regular - Frequent - Institutionalised interaction
Proper documentation of the outcome
Follow up
Continuous improvement

Dr. N. Mohanakumaran
Associate Director Research
Kerala Agricultural University (Southern Zone)
College of Agriculture, Vellayani)

- The performance of the on-farm trial programmes is mixed; in the Southern Zone a very strong programme is being undertaken.....

- This should be emulated in all zones, and direct contact between zonal scientists, extension staff and farmers in the field generally intensified.

IDA Supervision Mission

October 1990

KERALA AGRICULTURAL UNIVERSITY

RESEARCH - EXTENSION LINKAGE

KERALA AGRICULTURAL UNIVERSITY

As envisaged in the NARP concept, close and effective linkage has been established by the KAU with the extension departments (DOA, DOAH, DOF, DODY), research institutions of the commodity Boards (RRII, CRI, CCRI, CSB) and Central institutions (CTCRI, CPCRI, NRCS, CMFRI, CIFT, RRL etc.)

The linkage with the Directorate of Agriculture is very close, effective and exemplary. The participation of the Directorate of Agriculture personnel in the ZREAC meetings, T&V Monthly workshops, Onfarm trials, ORPs, Front line demonstrations, Diagnostic team visits, Kisan Melas etc. has been regular. Such an effective linkage, however, could not be established with the Departments of Fisheries, Forestry and Dairy Development inspite the sincere efforts of Kerala Agrl. University.

The linkage between KAU and the commodity Boards is need based. Effective interactions do take place whenever necessary.

Even though, a very effective and tight linkage between KAU and the Central institutes is envisaged under NARP, it has not been so. It needs to be further improved by active participation of scientists of the KAU and the central institutes in the research councils of the institutions concerned on a reciprocal basis.

The interaction between different zones of the KAU and the counter parts of the neighbouring SAUs has to be achieved the participation of scientists in the ZREAC of the zones concerned.

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TAMIL NADU AGRICULTURAL UNIVERSITY

Research extension linkage.

Linkage between research and extension is very closer which has helped in testing location specific technologies, identification of production constraints and feed back to refine the technology. This also has improved the technical competence of the extension workers in the transfer of technology. The linkage and coordination followed in the southern zone of Tamil Nadu are categories under the following four major levels.

1. Zonal level.
2. District level.
3. Division level.

1. Zonal level:

a) Zonal Research and Extension Advisory committee:

The Regional Research and Extension Advisory committee meetings are conducted for two days twice a year,

to review the zonal research efforts.

to assist in identifying the farming constraints/ problems at micro level.

to make recommendation on the regional extension as well as field testing programmes in the ensuing season.

to review the transfer of technology developed by the Research Stations/Centres and problems encounted in its effective implementation and

to identify the problems ofresearch based on the local priorities and immediate needs.

The following problems were identified and suggested for adoption.

1. Detailed rainfall analysis was suggested. Rainfall analysis was taken up for six out of the seven farming situations of the southern zone. Cropping pattern for the tracts were identified. Period for pre-monsoon sowing suggested.

2. For intercropping system, weed management practice was suggested. Integrated wee management with herbicide application

contd...

soon after sowing rain with thiobencarb at 1 kg. followed by one hand weeding a month later was found adequate for weed management.

3. The problem of poor germination of seeds in pre-monsoon sowing was focussed. Seed hardening seed treatments for cotton, sorghum, pearl millet and pulses were evolved. This seed hardening technique induces drought hardiness and seedling vigour.

On farm trials are conducted for fine tuning the technologies developed at the research centre whenever felt necessary.

2. District level:

a) Monthly workshop

Monthly zonal workshops are conducted separately for different districts of the Southern zone by the Research Scientists of different station/centres as mentioned below.

Districts	Scientists team
1. Ramanathapuram	Regional Research Station, Aruppukottai.
2. Pasumponmuthuramalingam	Agri.College and Res.Instt., Madurai.
3. Ramanejar	Regional Research Station, Aruppukottai.
4. Madurai	Tamil Nadu Agricultural University, Madurai.
5. Thirunelveli Kattabomman	Rice Research Station, Ambasamudram and Agri.College and Res.Instt., Killikulam.
6. V.O.Chidambaranar	Agricultural Research Station, Kovilpatti.

During the workshop relevant technologies applicable for the area and for the month are discussed and messages are formulated. Skill demonstration of newer technologies are also arranged during the second day of the workshop.

b/ Pre-season trainings:

These pre-season trainings are organised for two days twice a year prior to Kharif and Rabi seasons. The different Research Stations/Centres located in the Southern Zones are conducting these trainings to their respective district extension functionaries. The extension staff attending these trainigs get an opportunity to see demonstrations of various techniques conducted by research scientists besides visiting experimental plots at the Research Stations/Centres. Important issues related to the ensuing crop season are discussed based on past experience, feed back obtained from farmers, etc.

c) Diagnostic team:

Diagnostic team, consisting of Agronomist, Soil Scientists and Physiologist is formed for strengthening research extension linkages separetely for eight districts of Southern zone. The team undertakes joint field visit with the following objectives.

i) to diagnose and solve problems;
ii) to know adoption pattern/rate of adoption and rationale
iii) to identify specific farming situations and verify applicability of production recommendations in varying agricultural situations.
iv) to identify production constraints.
v) to identify reasons for yield variations
vi) to find thrust areas for research
vii) to review crop conditions, observe prospects, trends and shift in cropping pattern and operations in the field.
viii) to document farmers practices and rationale including innovative practices by farmers.
ix) to plan field visits and document experience.

In addition, adoption pattern and rate of adoptation of different techniques are discussed with Joint Director of Agriculture. Based on the farming situation, research priorities and testing are arranged. The field problems are documented and preparing the zonal status report.

d. Joint field visit:

Scientists and subject matter specialists of Department of Agriculture jointly undertake field visits with the following objective.

i) to solve field problems
ii) to inspect adaptive research trials/on-farm research and assess performance of different treatments.

As a result of joint field visit information gathered are analysed to identify production constraints. Some of the problems identified and solved are given below.

- following of leaves and pink colour formation of flower of jasmine.
- Yellowing and tip drying in rice
- reddening in cotton
- Chlorosis in sugarcane
- Chlorosis in rose
- Out break in whitefly in cotton.
- Green ear in cumbu
- Erect bunches in banana
- NTV in rice
- Wilt in redgram

e) District Technical Committee meeting:

District technical committee meetings are organised twice a year by the Joint Director of Agriculture. In which subject matter specialist at District and sub divisional level, scientists of the zone and farmer representative are participating.

f) Special food production programme:

This committee has District Collector as Chairman, Joint Director of Agriculture as convenor and representatives from Tamil Nadu Agricultural University, and Head of the Departments of EB, Cooperative, TANFED, minor irrigation, PWD and lead bank Manager as members. This committee meets twice a month and discuss about supply of inputs, energiesiation of pumpsets, providing irrigation facilities and new technologies. The University has brought one a booklet on Rice production technology for higher productivity specific to this programme.

3. Divisional level

a) 1000-acre demonstration

1000 acre demonstration was organised in each of the Agricultural division. The technical report including periodical visits are provided by the Scientists.

b) Oil Seed Technology Mission

Our Scientists in the Krishi Vigyan Kendra at Laduri and Regional Research Station, Aruppukottai.

Arranged demonstrations and minikits to popularise oilseeds and help in critical input programme.

c) Short Training programme:

Training programmes to upgrade the professional competence of the extension personnel and to develop their skill and confidence in the technology were organised on

- Pest surveillance
- Dryfarming technology
- Sheep rearing
- Post harvest technology and
- Plant protection technology.
- Mushroom production.

d) Extension oriented activities:

Posters, pamphlets, leaflets, booklets, farm school on All India radio on dryland technology, popular article on agriculture in dailies, monthly journals, farmers day celebrations, exhibitions, etc are published/organised periodically to increase the knowledge level of farmers.

Crop production technique, new varieties of crops, land preparation, soil management, cropping pattern, contingent plans during drought conditions, agronomical techniques, pest and disease management, etc. are the topics chosen for mass media communication through radio and T.V. by scientists and extension personnel of this zone.

g) Pest and disease:

For forewarning pests and diseases an excellent cooperative effort exists between the Extension Department of Agriculture, Horticulture and Oilseeds and University Scientists. Fixed plots for identified crops are arranged in each of the agricultural Officers division and weekly observations by the subject matter specialist of the department are shared with the Scientist in the University Centre every week. Fixed plots are located in the research stations concerned. Besides rowing survey are also undertaken and the information are passed on through AIR and other mass media.

h) IPM

In selected villages IPM technology is adopted under the guidance of University Scientist with the cooperation of the extension personals.

i) Field Day:

Every year field day is organised during the peak cropping period in which the farmers and extension personale visit the farm and exchange ideas. It is worth mentioning field day is organised exclusively for 'ber' at Regional Research Station, Aruppukottai in which reading ber growers and aspirants from all over the State participated.

f) Krishi vigyan kendra and plant clini Centre

Under auspicious of Tamil Nadu Agricultural University one Krishi Vigyan Kendra is functioning at Agricultural College and Research Institute, Madurai which serves as linkage between University Scientists and the extension agencies. Further it helps in dissemination of technologies and feed back on field problems. In addition plant clinic centres at Tirunelveli and Srivilliputhur act as diagnostic centres.

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ANDHRA PRADESH AGRICULTURAL UNIVERSITY

~~Item VI :~~ RESEARCH AND EXTENSION LINKAGES

A. Linkage with the State Department of Agriculture

With the introduction of Training and Visit System of Agricultural Extension in the State of Andhra Pradesh, the co-ordination and linkages between the State Department and the University have changed significantly from mere co-ordination committees and meetings to several functional linkages which have been developed right from the State level to the operational level.

The linkages between the A.P.A.U. and State Department of Agriculture are at two levels:

1. The linkage mechanisms for co-ordination of research and extension programmes at State level.
2. Linkage mechanisms between research and extension at regional and local levels.

1. Coordination of Research and Extension Programmes at State Level:

This is achieved through:

a) State Level Research and Extension Coordination Committee: Director of Agriculture/Agricultural Production Commissioner as Chairman, Deans, Directors and Senior Scientists of APAU and Senior Officers of State Department of Agriculture as members of the Committee is responsible for discussion of the main policy issues relating to research and extension and develop procedures as to how new research programmes are to be developed and to process the information for transfer of technology among farming communities. The Committee also reviews the Extension strategies developed for different agro-climatic zones in ZREACs at zonal level workshops and identifies common strategies for the State and also indicates priorities for different programmes.

b) State Level Research and Extension Advisory Council: This is a statutory body of APAU with Vice-Chancellor as Chairman, Director of Research as Convenor and all Deans of faculties, Director of Extension of APAU, Director of Agriculture, Director of Animal Husbandry, Director of Horticulture and other line departments representatives alongwith three non-officials of the Board of Management of APAU and Associate Directors of Research as members. This Committee was reviewing whether the research programmes are based on the feedback of the field problems received. This Council is now reconstituted by renaming it as State Level Research and Extension Advisory Council - APAU. According to the reconstitution, seven representative-farmers from seven agro-climatic zones are added to the already existing membership. The Council hitherto was reviewing only research programmes. Now the mandate is expanded to discuss the University Extension programmes thus enabling this Council to review, revise and approve the broad policies relating to Research Extension programmes developed within the University at various levels like ZREAC and at Project level by the Project Coordination and Programme Committees and Scientific Consortiums including the Transfer of Technology Programmes of ICAR implemented by the APAU. The Council is also being reconstituted widening its objectives and mandate to serve as an apex body for review of Research and Extension programmes of APAU.

c) State Level Technical Workshops: In these workshops, Director of Agriculture and his senior colleagues both at head-quarters and district level, Director of Research, Director of Extension and the Senior Scientists of APAU and other Scientists of various research organisations like ICAR, participate with a view to incorporate the latest findings into kharif and rabi production recommendations of State

Department of Agriculture based on the ZREAC proceedings and approve them. These Technical workshops are held to review and refine the technical programmes (both research and extension) developed by the University for different centres. These workshops continue for about a month with a daily schedule of reviewing and revising the discipline-oriented as well as interdisciplinary programmes by groups of research and extension workers involved based on their specialisation and experience. After a thorough review of these programmes based on the ZREAC recommendations, they are approved for implementation by the Director of Research and Director of Extension.

d) Periodic Interaction Meetings between State Development Departments, Panchayat Raj and Rural Development and APAU: Recently periodic Interaction meetings of the Departmental Heads and State level officers of State Development Departments and the Vice-Chancellor alongwith concerned Deans, Directors of Research and Extension of the University are held once in two months to discuss and exchange notes on crucial matters relating to development wherever University and the Departments have to act jointly and also on long pending issues that require joint decisions.

2. Linkage Mechanism between Research and Extension at Regional and Local Levels

The linkages at regional and local levels are established through the following mechanisms:

a) Zonal Research and Extension Advisory Councils at the Agro-climatic Zone level. The Associate Directors of Research of RARSs (ZRAs), Scientists of the zone, Joint Directors, Dy.Directors (and SMSs), and Asst.Directors of Agriculture (and SMSs) at district and sub-divisional level, selected representatives of farmers of the zone meet at the

headquarters of each of the Regional Agricultural Research Stations to deliberate on field problems to identify gaps which need immediate solutions and the problems that should go for field trials and technologies that should go for early demonstrations. These Councils meet once in kharif and rabi seasons for each zone. The outcome of these Councils at each ZREAC include identification of research gaps in the zone and projectising them for further research, identification of production recommendations for each farming situation in the agro-climatic zone, formulating the adaptive research which includes adaptive research trials to be organised at different locations of micro agro-climatic situations as well as on-farm research trials in different farming situations within micro-agro-climatic situations on the farmers' fields.

From 1989, emphasis has been placed on broad-based agricultural extension. Based on the guidelines issued jointly by the Government of India and the Indian Council of Agricultural Research to reconstitute ZREACs and Monthly Workshops to serve Broad-based Agricultural Extension, provision for participation of line departments like Departments of Agriculture, Animal Husbandry, Social Forestry, Sericulture, Fisheries etc. has been made. Action has been initiated to broad-base them since 1990. For example, ZREACs have been reconstituted by inviting line department representatives within the zone from all the above departments. For the time being only production recommendations relating to line departments and wherever facilities are available in the University, the research projects relating to important and priority problems of the line departments are also being developed in the ZREACs. Slowly, wherever possible, the representatives of these departments have also been included in the diagnostic teams and joint field visits. Further, there is need for appropriate changes in the procedures of conducting ZREAC to fully meet the requirement of Broad-based Agricultural Extension. The Director of Research and the Director of Extension are drafting the revised procedures and guidelines to make ZREACs fully serve the Broad-based Extension.

b) Diagnostic Teams: Separate diagnostic teams are also constituted for investigation of specific problems which need special attention in the zone by involving both University and ICAR scientists and departmental officers. There are also standing diagnostic teams constituted for each district with the scientists and extension personnel for agriculture for surveillance and diagnostic surveys of crop conditions, pest and diseases etc.

c) T & V Monthly Workshops: T & V monthly workshops are being organised by the Scientists in 20 Research Stations of Andhra Pradesh Agricultural University for the Subject Matter Specialists of the State Department of Agriculture in 22 districts. The monthly workshop is the main venue of inservice training for Subject Matter Specialists (SMSs) and of regular contact between extension and research workers. The main purpose of two-day workshop is to build up the technical skills of SMSs regularly in the field of their specialization so that they can meet effectively the actual technological needs of farmers. Another purpose is for researchers and SMSs to discuss and formulate relevant production recommendations for subsequent transfer to the Village Extension Workers (VEWs) and Agricultural Extension Officers (AEOs) by the SMSs in the next two fortnightly training sessions. Monthly workshops will have a strong practical orientation and encourage discussion among participants and practice skills. The learning that takes place through extension and research workers' discussions by sharing each other's experiences is as important as the composition of recommendations and solutions to farmers' problems. The monthly workshops specifically come out with the following outputs:

1. Specific production recommendations to different situations in the district for the next month (two fortnights).

2. Transforming these production recommendations into messages for two fortnights subsequent to the monthly workshop.

3. Develop lesson plans for fortnightly training programmes.

4. Review of adaptive trials, adoption of recommended messages, designing specific target-oriented messages and strategies to disseminate them.

5. Pin-pointing on impact points and their communication through oral and skill teaching.

In view of Broad-based Agricultural Extension emphasized since 1989, action has been taken to involve the line department representatives from the Departments of Horticulture, Animal Husbandry, Social Forestry, Fisheries and Sericulture in monthly workshops. The progress made in this direction is as follows. From each line department depending upon the availability of qualified personnel, 1 to 2 representatives have been identified asMaster Trainer(s) at district level in their subject-matter in addition to supplementing the master trainers in these subjects from the University wherever such staff are available in the University. They have been oriented about T & V system, its operation, their role as Master Trainers in the system with clearly defined responsibilities by organizing a special orientation and training programme for them exclusively. Similarly, Subject Matter Specialists with appropriate qualifications based on the availability of sufficient positions within the districts in the line departments have also been identified in each department below the district level. Training programmes to orient these categories of personnel in Training and Visit System of Agricultural Extension and their role in it have already been developed and are being implemented. Based on

last two years of experience in involving them in District Monthly Workshops, procedural details in organising monthly workshops to serve better the broad-based agricultural extension have also been thought off and are being implemented.

d) Field Trials/Adaptive on-farm trials: The programme of field trials finalised by Zonal Research Advisory Councils is carried out by both the University Extension Units and the State Department of Agriculture jointly. These field/ on-farm trials allotted both to the State Department of Agriculture and the University Extension system are jointly planned and executed in the field. The Subject Matter Specialists of Extension Education Units of the University, apart from supervising a certain percentage of field trials directly (varying from 20-25 per cent), they make supervisory visits to the trials implemented by State Department of Agriculture in the jurisdiction of these units alongwith the University Scientists who are concerned with the trials.

e) Inservice Training Programmes: Every year a state Level Training Planning Workshop is organised by the Directorate of Extension, APAU in the month of January with the State development departments like Department of Agriculture, Animal Husbandry, Horticulture, Fisheries, Women and Child Welfare, Sericulture and Social Forestry. This meeting will be attended by the representatives of the State development departments and those University specialists who are involved in training extension personnel at different levels - SMSs, mid-level Managers of Extension, lower-level Supervisors in all the development departments including Village Level Workers in the State Department of Agriculture and Anganwadi workers in the Women and Child Welfare Department, Foresters in Social Forestry etc. is made in this workshop. Further, based on the training needs,

assessment, different training programmes are developed for different categories by the groups of Scientists, Extension Specialists and other Extension Managers. After identifying and deliberating on different courses, a schedule of training programmes is developed for the following organisations:

1. The Training Programmes to be organised by University for different categories of personnel in different development departments including farmers, farm women and rural youth.

2. The Training Programmes to be organised by each of the State development departments for lower level Extension workers in the Training Institutions managed by the State Development Departments.

Wherever assistance of the University is required for organising the training programmes by the State development departments apart from the training programmes organised by the University in terms of resource personnel, training material etc. will be provided to the concerned departments. The training programmes organised by the University are very large in number for all the line departments put together covering middle level managers and specialists running into more than 900-1000 training days in a year offering opportunity to many scientists to interact directly with development personnel and farmers.

f) Joint Committees/Consortiums. In addition to above, various Joint Committees and Consortiums are constituted with the officers of State Department of Agriculture and University to develop and implement University programmes in KVKs, EEUs, operational and other special operational projects for scheduled caste/tribals etc. These are

constituted at the Project level as well as at State level but the programmes developed by these consortia and Committees are finally reviewed and approved both at ZREACs as well as at State Level Technical Workshops.

In addition to the above, State Level Variety Release Committees to release the approved varieties of crops, a large number of Kisan Melas, organization of RAWE programme- a novel programme to train the B.Sc.(Ag.), B.Sc.(Hort.) and B.Sc. (Home Sci.) students in the villages, the concerned State Departments are also involved to build effective linkages between APAU and State development departments upto the operational level in villages.

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UAS BANGALORE

RESEARCH EXTENSION LINKAGE

RESEARCH-EXTENSION LINKAGES AT ZONAL LEVEL

With the working of the NARP system in Karnataka for the past ten years most of the Scientists and Extension workers have become familiar with NARP concepts. The activities that provide formal linkages between Scientists and Extension workers at the zonal level are as follows:

(i) ZRAC workshops
(ii) Bi-monthly meetings (Formerly Monthly meetings)
(iii) District Diagnostic Teams
(iv) On-farm Trial visits

The ZRAC workshops are now being held zonewise and the reduced number of participants permits indepth analysis of situations, problems and formulation of research and extension programmes.

The participation of the Department of Agriculture and Horticulture, in that order, has been quite effective in bringing about greater relevance of the annual programme content. However, the involvement of other line departments such as Animal Husbandry and Veterinary Services, Fisheries, Sericulture, Forestry etc. continue to be weak. This is presumably due to their failure to perceive a stake for themselves in the NARP system.

VI. Research-extension linkages : Hill Zone of Karnataka under UAS(B), Mudigere

The Research Advisory Council and Research Formulation Committees of the region comprising of Heads of Departments, Co-ordinators of different disciplines, scientists associated with the region and Research Institutes, Officers of the Development Departments, Central Research Institutes and a few progressive farmers are mainly responsible for identifying problems of the region, reviewing the programme of research and for suggesting measures for improvement.

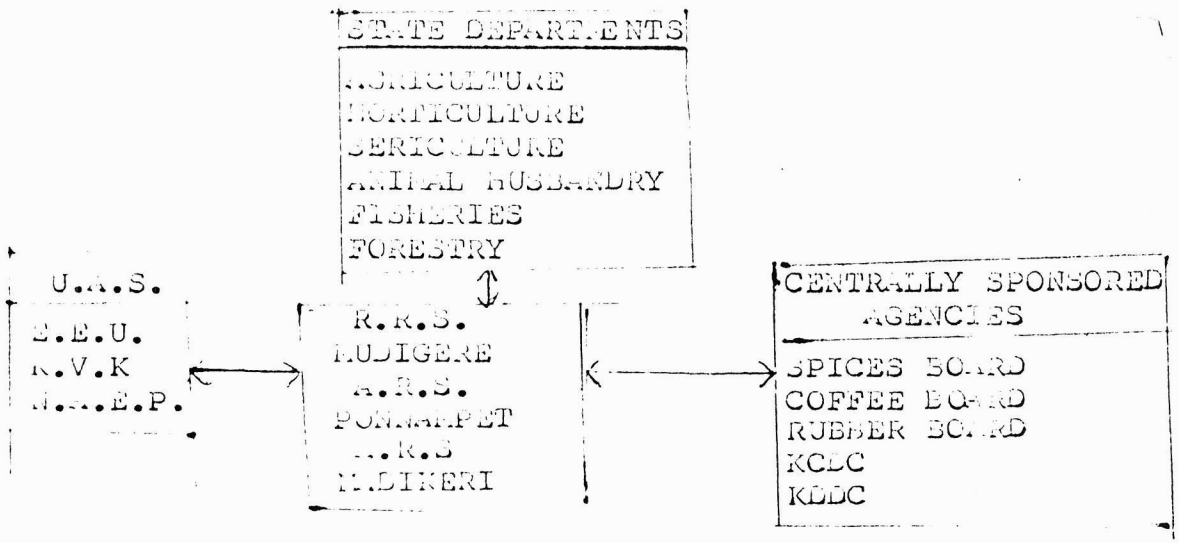
a) Linkage with research establishment:

There has been a close co-ordination between scientists of the region and the following institutions.

Organisation	Location of Research stations	Area of Research for collaboration
1. Spices Board	a) Appangala b) Sakleshpur	Cardamom, Pepper/Cardamom
2. Indian Institute of Horticultural Research	a) Hesarghatta b) Chettahalli X c) Gonikoppal X	Vegetables Citrus
3. Central Coffee Research Institute	a) Balehonnur	Coffee
4. Central Sericulture Research & Training Institute.	a) Mysore X b) Chirthahalli X	Sericulture
5. Rubber Board	a) Kottayam	Rubber

b) Linkage with extension agencies

The region has very close linkage with the extension agencies in transmitting the research findings as depicted below:



Constraints in Extension Linkages:

1. Non-participation of officials of Development Departments like Horticulture, Sericulture, Fisheries, Forestry and Animal Husbandry in ZRAC and ZRFC and AEP bimonthly workshops. Besides some of the Principal Agricultural Officers are also not attending the ZRAC and ZRFC meetings personally.

2. While implementing some of the Centrally Sponsored Programme with subsidy benefits, the officials of the Development Departments are deviating from the technology recommendations made by the UAS scientists so as to utilise the subsidy facilities provided in implementing these programmes.

3. Though there are feed back informations from the Department of Agriculture, the same is lacking in case of other Development Departments like Horticulture, Fisheries, Sericulture, Forestry and Animal Husbandry.

4. Co-ordination between the scientists of the region and the scientists of other Research Institutions/ Centrally sponsored Agencies are to be further strengthened.

5. Development of Technical programme to solve certain constraints in respect of soil and water management, in the discipline of Agricultural Engineering and Animal Husbandry could not be materialised due to lack of personnel.

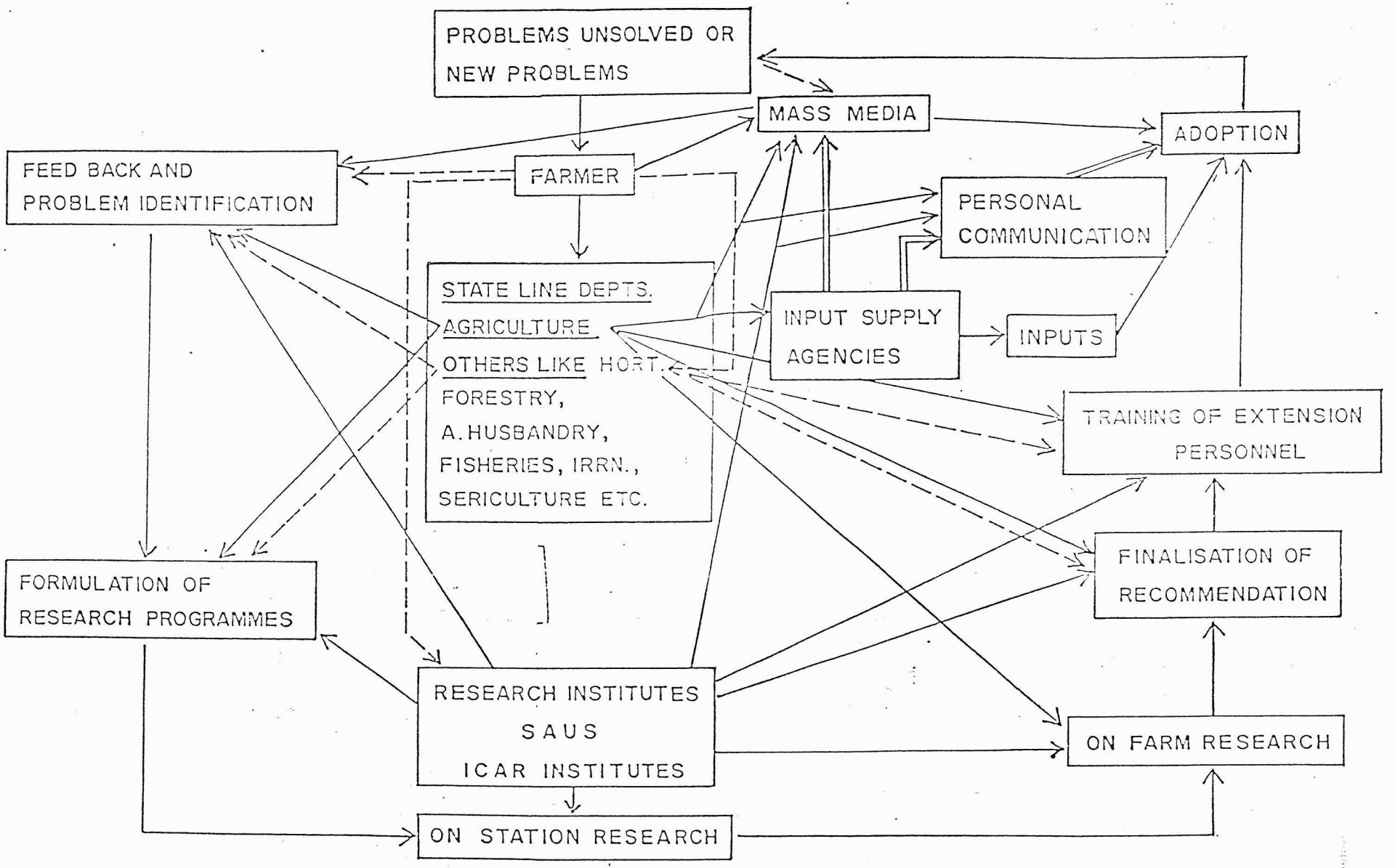
VI. Research-Extension Linkages : Southern Transition Zone of Karnataka (Zone VII)

Geeting feed back from the real situations, problem identification, prioritization and formulation of Research programmes are done jointly by Research Institutes and State Development departments, involving diagnostic surveys, personal communication with farmers, taking note of mass media, communications, etc. However the present efforts, though on systematic lines are not adequate to know the real problems and to understand the complexities involving socio-economical conditions of the farmer and the society. The following approaches may help in improving the efficiency of the present system.

1. Problems should be approached from the farming systems approaches involving various activities - agriculture and allied.
2. Whole farm development resulting in the sound family budget should be the aim.
3. Gender issue should be considered - giving due recognition to involvement of farm women in various enterprises.
4. More stress should be laid on joint diagnostic surveys. Better mobility may be provided to research stations for the purpose.
5. More number of farmers (five instead of two as at present) may be involved in the ZRAC and ZRFC workshops.
6. The linkages with Agriculture Departments is strong, however, with other departments it is week. The linkages with other departments like Horti-culture, Forestry, Irrigation, Sericulture, Animal Husbandry, Fiesheries etc. should be strengthen by following ways in order to aim at the alround development of farmers.
   i. Widening the research base of the Regional/Zonal Research Institutes to cover enter-prises other than agriculture also in order to generate technology useful to other departments also.
   ii. By arranging for regular training of extension personnel in these departments at the Regional/Zonal Research Stations.
7. At present, participation of farmers in the research processes like Operational Research, On-Farm research is very poor. This must be strengthened. Farmers participatory research on Farming systems, involving whole Farm Demonstrations should be intensified.
8. Extension service of the Universities should be revitalised.

Table-5 Contd.

Existing farming systems			Modifications suggested
AES-4.	1. Agri(Paddy,Ragi, maize,cotton, sunflower,pulses, groundnut)	+ Animal Husbandry + Horticulture (Mango,coconut)	Inclusion of sericulture,social forestry and dairying.
	2. Commercial Plantations (Coffee)		
AES-5.	1. Agri.(Ragi,cotton, tobacco,maize, sunflower,ground nut,pulses,cotton)	+ Animal Husbandry + Horticulture (Coconut,mango, vegetables etc.)	Inclusion of social forestry,Sericulture and dairying.
	2. Agri.(Rice,Sugar-cane,pulses)	+ Animal Husbandry + Horticulture (Arecanut,coconut, vegetables)	
AES-6.	1. Agri.(Rice,ragi, sorghum,groundnut,onion,pulses, cotton)	+ Animal Husbandry + Horticulture (coconut,Areca-nut, mango,vegetables)	Indusion of forestry,sericulture and dairying.
	2. Commercial horticulture(Arecanut, coconut, mango,banana)		
AES-7.	1. Agri.(Rice,Sugarcane,maize,pulses)		Intensification of vegetable and flower production.
	2. Agri(Rice,sugarcane maize,pulse,)	+Horticulture (coconut,Arecanut, oilpalm,vegetables)	
	3. Commercial Horticulture (Coconut,Arecanut,oilpalm,betelvine, banana and vegetables).		



RESEARCH-EXTENSION LINKAGES IN GENERATION AND DISSEMINATION OF TECHNOLOGY

(DOTTED LINES INDICATE WEAK LINKAGES AND
DOUBLE LINES INDICATE VERY STRONG LINKAGES AT PRESENT)

UAS DHARWAD

RESEARCH EXTENSION LINKAGE

RESEARCH AND EXTENSION LINKAGE in Agro-climatic Zones under UAS (Dharwar)

LINKAGE BETWEEN RESEARCH ACTIVITIES

The University of Agricultural Sciences, Dharwad(UASD) has 32 Agricultural Research Stations, located in northern part of Karnataka. The area comprises of the entire zones 1, 2, 3 and 8 and parts of zone 9 and 10. Problems of fundamental nature are mainly dealt at the Main and Regional Research Stations while the need based location specific research is taken up at 32 Research Stations scattered all over the area under jurisdiction of University of Agricultural Sciences, Dharwad. The National Agricultural Research Project (NARP) has helped to strengthen zonal research stations and identified research stations in all the agro-climatic zones with emphasis on solving location specific problems of the zones.

Linkages within the zone

With the implementation of NARP since 1980, the regional research organisation for doing location specific research have been strengthened. The Associate Director of Research is the overall incharge of research in entire agro-climatic zone. He Coordinates and directs the activities of different research stations in the zone. The draft of technical programme of work incorporating the location specific problems and suggestions made at the Zonal Research Advisory Committee (ZRAC) are discussed at meetings convened at zonal main station. Senior Scientists and Heads of departments of various divisions of the University, Joint Directors of the Agriculture, Principal Agricultural Officers, Dy.Director (Soil Conservation), Joint Director of Agriculture (Farm Trials), Dy.Director of Agriculture(Crop Botany), District level officers of the Department s of Horticulture, Animal Husbandry, Fisheries, Forestry and scientists of the rank of Assistant Professor and above in the region and Director of Research and Director of Extension of UAS., Dharwad participate in the meeting which is called

as Zonal Research Advisory and Zonal Research Formulation Committee meeting wherein the problems of the zone as identified and to revise the programme of research and research needs, results of adaptive trials and recommendations for adoption are discussed in detail. The research programme for different stations thus developed are placed before ZRAC for discussion and adoption before submission to the research council for final approval. The technology for adoption by the farming community is placed before the State Technical Committees for final approval.

Linkages between the Zones

The linkage between different zones is through Associate Director of Research, Divisional meetings and discussions between the Senior Scientists and the State Departmental Officers provided linkages between the Zones. The Zones are benefitted by maintaining good linkages among themselves with which the results of the main crop stations located inside the zone are utilised by outside zones through multilocation testing. In cases where a crop is dominant in more than one zone, exchange of advanced breeding materials is also practiced.

At the University level, the Director of Research coordinates the work of all research stations and in different faculties in the entire Northern Karnataka. The Heads of various divisions will have their annual and half yearly meetings, well ahead of ZRAC and ZRFC meetings and discuss the research work done, proposed technical programme and release of varieties/packages of practices. At the ZRAC and ZRFC meetings again zonewise presentations are made giving stress to the need based research and recommendations. Later the research programmes prepared and submitted by the Zonal Associate Directors of Research for their respective zones are scrutinized, discussed and approved by the Research Council of the University. The technology finalised in the zone for transfer to the farming community are discussed and approved by the State Level Technical Committees.

Linkage with extension agencies

The Directorate of Agriculture as the primary agency for the transfer of technology in agriculture. The Karnataka Government has adopted the system of "Training and Visit" (T&V). This is headed by Additional Director of Agriculture under the overall control of the Director of Agriculture. The Extension Education Units of UAS will also help in conducting trials in the zone and also for feed back.

Bimonthly workshops

In the subject matter specialists (SMS) meeting Principal Agricultural Officer (PAO) is the convenor and the Extension Coordinator is the Leader. The team assisting the Extension Coordinator in the Bi-monthly SMS meeting consists Senior Scientists from various disciplines of agriculture sciences and on special occasions on invitation other scientists also participate in the meeting and impart training to the staff of the department of agriculture. Before every SMS meeting, advance workshops are conducted to finalise the details for the monthly meeting of the subject matter specialists.

The agencies and departments involved in the SMS meeting from department of agriculture and all other developmental departments like Horticulture, Forest, Animal Husbandry, Nationalised Banks, Seed, Fertilizer and Pesticide supplying firms and UAS.,Dharwad scientists. In these meetings the crop and weather situations are reviewed. The field problems concerning pests, diseases, soil and crop management faced by the farmers are posed by the extension personnel to which the resource persons (Master trainers) recommend solutions. Where solutions are not available, the problem is noted for investigation. The calendar of operations for the next two fortnights for various crops alongwith impact points, are formulated. On the second day, field visits to A.R.S. and villages are arranged to study the crop situation, adoption pattern and identification of constraints, and to impart training on practical aspects of crop production on part of skill teaching.

Zonal Workshops

The Zonal Research Advisory Committee (ZRAC) meets twice a year under the Chairmanship of Associate Director of Research, well in advance of the commencement of the crop season. The committee consists of JDA from department of Agriculture, heads of the departments, heads of the research stations and senior scientists of the University, District level officers from various developmental departments and progressive farmers. The meetings are held for two or three days to help in the identification of constraints and research needs of the zone. The committee takes up the review of the work done in the preceding season, discusses the field problems and finalizes the cropwise production recommendations and modifications to the package of practices duly identifying research gaps for formulating the technical programmes for stations and schemes. The proceedings of the meetings are transmitted to Research Council of the University and State Level Technical Committees.

Short training programmes

The Associate Professor of Extension acts as a liason officer between the Department of Agriculture and University and assist for short in-service training programmes for the Department staff to up date the knowledge and improve the professional competence of the extension personnel. Such programmes on crop production technology for all important crops are conducted at the research stations, district headquarters and villages, in collaboration with developmental departments and input agencies. State level advanced crop production technology training programmes of three to four days duration on kharif and rabi crops are organised in collaboration with Department of Agriculture. The scientists also participate in the training programmes and farmers meeting organised by the input agencies at village level and impart training to the farmers.

Joint Field visits

Joint field visits by the scientists and extension staff of all developmental departments are undertaken whenever necessary to meet following objectives:

a) To develop diagnostic skills for the subject matter specialists after the SMS meeting on the second day of meeting. The visits may be to nearby village or A.R.S., station. Where arrangements are made to impart training on practical aspects of crop production and diagnostic skills.

b) Diagnostic teams

The diagnostic team consists of Agronomists, Entomologists, Pathologists etc., who often make visits alongwith the officers of Department of Agriculture to the fields. These teams oversee crop problems, monitor pest and diseases and issue forecasts and also suggest remedial measures on the spot to the farmers even though the teams are popular the major constraint is the transport facility and budget requirement.

c) Field visits are also made by the scientists with officers of the Department of Agriculture to monitor the progress of farm trials and demonstrations to study critically the performance of recommended practices.

d) Drought management teams

Special teams are constituted by the senior scientists and departmental staff to fight the drought which is very common in this zone. The team suggests the remedial measures to fight back the drought and some long term remedial measures. The committee also suggests contingent plans.

University extension activities

The Director of Extension, U.A.S., Dharwad, coordinates all the extension programmes of the University. The programmes are implemented in the zone through Associate Directors of Research of the respective zones.

Krishi Vigyan Kendras (K.V.K.)

The Krishi Vigyan Kendras are functioning to impart training to the sons of farmers. It also undertakes seed multiplication and distribution programmes for the nearby areas. The senior scientists of various disciplines of the University are often invited to give training at this centre.

Lab to land programme

Lab to land programme is in operation in this zone. Associate Director of Research is the leader of the team. Besides leader, other scientists of the station are also actively involved in imparting training to the beneficiary farmers and help in the transfer of economically viable technology. The main objectives of the programme is to bring direct contact between scientists and farmers, so that both will have mutual benefits.

Operational Research Project

As a part of technical programme, coordinated project for research on water management, ARS, Belvatgi, ORP activities are initiated with following objectives.

i) To study the present water utilization pattern and to test the improved water management technology developed at the research station with a view to improve the efficiency of water use.

ii) To study the impact of improved water management practices on agriculture production and economic benefits in the command area.

iii) To generate more effective water management technology facilitating more efficient use of the natural resource.

For this purpose a compact block of 219 acres comprising two sub-distributories of Malaprabha Right Bank Canal has been selected. The technologies like i) Scheduling of irrigation for hybrid cotton, ii) Improved method of irrigation for wheat and iii) Discharge measurement in study area, are demonstrated.

Publication programmes

Extension publications are brought out regularly by various research stations incorporating latest research results on various aspects. Booklets, panphlets, folders, leaflets are printed and distributed to the farmers and extension personnel. The achievements and new findings of the various research stations are published in the news papers as a mass media communication. Some times urgent messages on pests and diseases and remedial measures are also sent to local news papers.

Radio/TV programmes

The All India Radio Dharwad and Gulbarga invite senior scientists of various disciplines and arrange for a radio talk or some quick dissemination of information on new varieties, crop production technology, soil and water management practices, cropping pattern, plant protection aspects and contingency plan. Associate Director of Research of this zone is the member of the 'Krishi Ranga', rural programme advisory committee of A.I.R. The A.I.R. devotes more than one hour for broadcasting agricultural programmes and information every day.

Since T.V.Programme facilities are only available at Bangalore and limited to its nearby places, these services cannot be utilised frequently. But only on special occasions the T.V. programmes are organised.

Extension Education Unit:

One extension education Unit is existing in each zone (2, 3 and 8). In this unit, five specialists are included who take up the following programmes.

- Organising the farm verification trials
- Testing new innovations
- Organising demonstrations
- Whole farm and whole family demonstrations
- Providing solution to the field problems

Frontline and First line Demonstration

The extension unit organises first line demonstrations of the proven technology on a large scale (minimum of 5 ha at a location).

Senior Scientist of each crop organise front line demonstrations ranging upto 50 per crop to demonstrate the potential of the crop and new technologies to the farming community.

Other extension programmes: a) Village adoption programme:

Under NARP and Prime Minister's 20 Point Programme, villages are adopted by all the research stations to identify the farmers' problems, offer solutions and disseminate crop production technology through demonstrations, group meetings, training programmes, seminars and meetings. The involvement of input agencies, Nationalised banks and some co-operative organisations becomes necessary to cater the needs of financial assistance. The input agencies also arrange extension programmes in these villages where the scientists of research stations actively participate.

b) Krishi mela, Field day and Exhibition

Krishimelas, field days and exhibitions are regularly organised at research stations in the zone. The farmers from all the corners visit on these occasions and see lot of new things on the farm which help for better adoption of new technology. During Krishi Melas question and answer sessions are also conducted where the farmers are welcomed to pose any of their doubts to the scientists directly and get the solutions on the spot.

c) Agricultural work experience programme: The students from various colleges visit the research stations and camp in villages in the vicinity of research stations. These camps help the students to know about the recent developments in the field of agriculture and the problems of the farmers.

CONSTRAINTS IN RESEARCH - EXTENSION LINKAGE

Technology	Adoption	Constraints
I Varieties	Average 70 per cent	1) Nonavailability of certified seeds of improved varieties 2) Lack of seed/plant multiplication programme
II Fertilizer Management	About 60 per cent	1) Poor financial position of the farmer 2) Nonavailability of suitable fertilizers 3) Lack of technical know-how on fertilizer usage by farmers and Agricultural Assistants
III Cropping Systems	About 10 - 40 per cent	1) Nonavailability of suitable implements. 2) Lack of technical know-how by farmer and Agril. Assistants
IV Plant Protection	About 30 per cent	1) Nonavailability of suitable chemicals 2) Lack of skill in usage by farmers and Agril. Assistants 3) Financial constraints to purchase spray equipment by the farmers.
V) Growth regulators	About 10 - 15 per cent	1) Nonavailability of suitable chemicals. 2) Lack of skill in usage by farmers and Agril. Assistants 3) Financial constraints to purchase spray equipments by the farmers.

1	2	3
VI	Nursery Management	About 50 per cent	1) Lack of trained personnel 2) Nonavailability of new tools and nursery materials
VII	Weed Management	About 20 per cent	1) Nonavailability of suitable chemicals 2) Lack of skill in usage by farmers and Agril. Assistants 3) Financial constraints to purchase spray equipments by the farmers.
VIII	Improved tools and implements	10 per cent	1) Nonavailability of improved Agricultural implements at low cost, suiting to the local condition. 2) Non-availability of improved irrigation systems, within the reach of average farmer.
IX	Participation	-	Except Department of Agriculture, participation of other Developmental departments in zonal NARP Workshop and bimonthly SMS Workshop is very meger.

FARMING SYSTEM RESEARCH

The farming system research was discussed in the inaugural session along with management information system by Dr. A.P. Saxena. It was emphasized that the Director of Research of all SAUs may identify one potential zonal station for the purpose of farming system research with existing resources. The following research stations have been identified in the Southern Region SAUs:

KAU	- Kumarakom
TNAU	- Aduthurai
APAU	- Palem
UAS, Bangalore	- Mandya
UAS, Dharwad	- Raichur

Financial Position of Southern Regional State Agricultural Universities as on 30..11..1992

Sl. No.	SAU	Sub-Project sanctioned as on	Outlay sanction as on	Funds released upto	Actual site-Expt. upto	
1	APAU	1. Tirupathy (1.1.79)	105.04	80.04	92.00	*
		2. Dir. Research (1.12.79)	14.50	14.04	14.04	Settled
		3. Lam (30.6.80)	112.52	97.35	89.19	
		4. Palam (23.6.80)	135.24	135.24	123.32	
		5. Jaqtial (11.12.80) CW (31.8.88)	99.00	89.98	80.40	
		6. Nandyal (8.12.88)	73.56	73.56	70.33	
		7. Ankapalle (19.12.82) CW (31.3.87)	67.87	67.87	68.30	
		8. Chintapalle (24.8.85)	67.87	67.87	68.30	
		CW (20.9.90)	79.06	65.72	72.69	
		9. Kadri-Nellore (21.8.85) CW (31.12.90)	68.03	57.71	72.37	
		Sub-Total	754.82	681.51	682.64	
		10. Suppl. Sub-Project				
		A. Krishna Godavari Zone (1.10.88)				
		1. Vijavarai; 2. Kakinada 3. Gorikabedu; 4. Challapali; 5. Maruteru 6. Darsi; 7. Lam	126.20	110.52	55.22	
		B. North Coastal Zone (1.10.88)				
		1. Reqelu; 2. Yelamanthilli	21.43	13.95	15.89	
		C. Southern Zone (1.10.88)				
		1. Utukur; 2. Tirupathy 3. Kavali; 4. Anataraqupetta	35.22	23.48	15.83	
		D. North Telenqana Zone (1.10.88)				

1. Jaqtial; 2. Karimnaqar; 3. Mudhel; 4. Waranqal; 5. Rudrur; 6. Adilakad E. Scaree Rainfall Zone (1.10.88)	36.37	29.03	17.05
1. Nandyal; 2. Peddyapaly; 3. Anantpur F. Southern Telenquana Zone	17.98	11.74	7.37
1. Palem; 2. Tendur; 3. Sanqar G. High altitude zone(1.10.88)	38.43	36.10	24.38
i. Seetampata	5.43	4.71	3.68
11. Mallapalli (1.10.89)	40.00	26.68	11.52
12. Additional funds for CW	12.05	12.05	12.05
Additional funds for Library	14.00	14.00	14.00
13. Funds for improvement of Library	17.00	17.00	--
14. PCs for ADRs & ZRs	36.84	--	--
15. AP cyclone proofina	450.00	296.81	80.85
Sub-Total	850.95	596.07	257.84
Total	1605.77	1277.58	940.48
2 UAS(B)			
1. Bijaipur	88.58	83.26+ 5.32*	88.58
2. Dir. of Research(30.8.80)	15.08	13.43+ 1.65*	15.08
3. Bidar-Raichur (30.5.81) CW (30.9.88)	40.84	40.23	40.19
4. Branmavar (30.5.81) CW (26.11.88)	125.79	125.20	130.07
5. Mudiqre (23.5.81) CW (22.5.87)	80.13	70.68- 5.67**	65.01
6. Shimoga (24.3.82) CW (24.3.87)	51.77	51.77	50.45
7. Nagmangla (23.2.83) CW (30.9.88)	46.69	46.39+ 5.79	52.18
Total	448.88	438.05	441.56

* To be released

** For refund

	8. Bidarmangudi	193.32	126.81+ 15.66* 5.14*	113.45
	9. Supple Sub-Project(1.1.88)			
	A. Eastern Dry Zone (1.1.89) (Chintamani)	31.39	22.48	22.61
	B. Southern Dry Zone (Mandya, Nagenhalli, Mudevier)	60.63	43.98+ 4.41*	36.74
	C. Southern Transition Zone (Navelle Zone, Kathelgera)	85.70	66.57+ 2.30*	55.53
	D. Hill Zone (1.1.89) (Mudigere & Ponampat)	43.34	30.81+ 1.53*	23.98
	E. Coastal Zone (Brahamavar & Ullal)	29.07	20.51+ 1.81*	22.14
	10. Additional funds for Library	12.00	12.00	--
	11. Funds for improvement of Library	17.00	17.00	--
	12. PCs for ADRs & ZRs	32.34	--	--
	13. Resource characterisation of rainfed farming system (30.9.92)	45.00	--	--
	Sub-Total	549.79	371.01	274.45
3	UAS (D)			
	1. Dir. of Res. (1.7.88)	16.16	6.97	3.51
	2. Suppl. Sub-Projects			
	A. North Eastern Transition Zone (Bidar) (1.1.89)	26.35	17.43	8.17
	B. Northern Dry Land Zone (Bijaipur, Hagari, Gangawati, Sringuppa & Ara) (1.1.89)	55.90	31.94	20.45
	C. North Eastern Dry Zone (Gulberga, Raichur) (1.1.89)	56.44	44.77	18.81
	D. Northern Transition Zone (Hanumanmatti, Nippani, Sankeshwar, Belgaum Mugad) (01.1.89)	67.68	33.31	23.44

*To be released

E. Hill Zone (Sirsi) (1.1.89)	19.40	11.87	6.17
F. Coastal Zone (Amkola)(1.1.89)	14.16	10.82	7.40
3. Additional funds for Library	8.00	8.00	6.90
4. Funds for Improvement of Library	17.00	17.00	--
5. PCs for ADRs & ZRs	17.11	--	--
Total	298.20	182.11	94.85
4 TNAU			
1. Dir. of Res. (10.1.81)	11.37	11.38	11.80
2. Aduthurai-Trichy (5.3.81) CW (30.6.87)	121.24	114.92	119.31
3. Paiyur (16.9.87)	58.44	58.44	57.99
4. Bio-logical Res. 16.9.81	30.56	30.56	30.07
5. Vridachalam (29.3.82) CW (10.11.87)	94.49	89.43+ 4.70*	94.49
6. Pechiparai (18.1.83)	43.29	8.44	7.92
7. Thadiankudissi (5.2.82) CW (3.3.88)	47.30	47.23	50.22
8. Aruppukettai (12.7.82) CW (10.11.87)	107.65	107.65* 5.85*	111.74
Total	514.34	478.60	483.54
9. Suppl. Sub-project(1.11.88)			
A. North Eastern Zone (Vellore & Kattupakkam)	78.90	59.50	56.53
B. North Western Zone (Paiyur, Pottaneri & Namakal)	71.15	63.02+ 8.08*	65.24
C. Cauvery Delta Zone (Aduthurai-Trichy, Kattu-chetan, Srigumani)	86.49	84.54	105.25
D. Western Zone (Bhawanisagar, Mettuppa-layam & Periakulam)	125.31	122.28	80.75

* To be released

E. South Zone (Arruppukkottai, Puthukkottai, Sirivilliputhur, Killikulam)	54.33	46.23	52.56
F. Hilly & Tribal Zone (Yercaud, Vijayanagar and Sandynallah)	70.68	56.81+ 5.78*	52.03
10. Suppl. Pechipparai (1.11.89)	87.95	63.16+ 16.14*	39.84
11. Addl. Funds for CW	17.35	17.35	16.09
12. Addl. funds for Library	14.00	14.00	14.00
13. Funds for improvement of Lib.	17.00	17.00	--
14. PCs for ADRs and ZRS	36.84	--	--
15. Resource characterisation of rainfed farming system(30.9.92)	45.00	--	--
Sub Total	705.00	573.89	482.29
Total	1219.34	1052.49	965.83
5 KAU			
1. Pillicode (9.8.80) CW (31.12.85)	114.02	99.60	114.02
2. Dir. Res. (13.7.80) CW(31.8.87)	10.69	10.71	10.69
3. Pattambi (27.11.81) CW (31.12.86)/(31.8.87)	84.46	82.26	79.66
4. Vellayani (30.11.81) CW (31.7.87)	89.98	88.98	88.98 St
5. Kumarakom (30.11.81) CW (28.2.87)	113.91	113.89	113.91
6. Water Management ih Chalakudy (25.5.83)	21.72	20.77	16.25
7. Ambalavayal (24.11.83)	33.37	33.37	33.68
@ To be released to Pilicode for settlement of all zones of KAU		7.61	
Sub-Total	468.15	457.19	457.19

*To be released

8. Suppl. Sub-projects (20.4.88)			
A. North Zone (Pilicode, Panniyoor)	48.16	39.58	37.43
B. Central Zone (Pattambi, Kannara, Chalakudy)	60.79	54.63	61.79
C. Southern Zone (Vellayani)	41.08	38.29	28.90
D. High Range Zone (Ambalavayal, Pampadumpara)	51.30	43.13	47.40
E. Problem Area Zone (Kumarakom, Vyttila, Kayamkulam, Moncompu)	56.02	52.21	51.89
9. Addl. funds for CW	10.00	10.00	9.00
Addl. funds for Library	10.00	10.00	9.00
10. Funds fof improvement of Lib.	17.00	17.00	--
11. PCs for ADRs & ZRS	28.73	--	--
Sub-Total	323.08	264.84	245.41
Total	791.23	722.03	702.60