

RP 03165

**Second Policymakers' Seminar
to Review the Program
of the Improved Vertisols Management
in Relation to Assured Rainfall Regions of India**

10-11 September 1982

A Summary

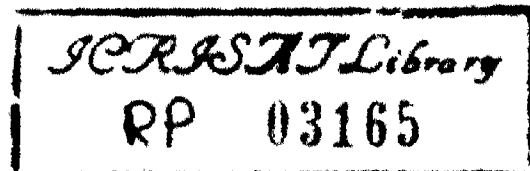


ICRISAT

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NOTE TO THE READER

This is an informal report of the Second Policymakers' Seminar held at ICRISAT Center to review the Program of the Improved Vertisols Management in relation to Assured Rainfall Regions of India. The report is designed to stimulate thinking and comments from professional colleagues and is not a formal publication bearing the endorsement of the institute.



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PREFACE

At the First Policy makers' Seminar¹ on improving the management of India's deep black soils, held in May 1981 at New Delhi, it was decided that operational research projects should be implemented on a priority basis by the concerned State Departments of Agriculture to adapt and test suitable technologies for the black soil areas. ICRISAT agreed to provide the first-hand knowledge on the techniques evolved by it to the selected officers from the State Governments and the Government of India. Following these decisions, five groups of senior officers from the states of Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Gujarat, Andhra Pradesh, and from the Ministry of Agriculture, Government of India, visited ICRISAT Center for a period of 2-5 days between 31 August and 4 December 1981, to acquaint themselves with the technology and its performance.

Two, 1-week long workshops were conducted during this time for middle-level state officials responsible for guiding and supervising the operational research or pilot studies in the states. In January-February 1982, a 2-week training program was organized for the extension officers and subject-matter specialists who have direct responsibility for working with the farmers in implementing the technology. A total of about 100 officers visited ICRISAT Center. They spent 694 man-days in training/visitation programs. A number of watersheds were then jointly identified in different states for on-farm verification tests in the 1982-83 cropping season. The work commenced in February 1982 and kharif (rainy season) crops were planted in June-July. Currently, the verification of the black soils management technology is progressing at 10 locations in four states:

State	District	<u>No. of locations</u>
Andhra Pradesh	Medak	3
Karnataka	Gulbarga	1
	Bidar	2
Madhya Pradesh	Raisen	1
	Guna	1
Maharashtra	Parbhani	1
	Akola	1

In addition, collaborative work with Gujarat Agricultural University on the evaluation of suitable cropping systems for black soil areas of the

¹Improving the Management of India's Deep Black Soils. Proceedings of the Seminar on Management of Deep Black Soils for Increased Production of Cereals, Pulses, and Oilseeds, held at New Delhi, 21 May 1982. Sponsored by the Indian Ministry of Agriculture, the Indian Council of Agricultural Research (ICAR), and ICRISAT. 106 pp.

state, and with Tamil Nadu State Department of Agriculture on the identification of appropriate components of the technology for a selected watershed at Aruppukottai in Tamil Nadu are in progress.

The project in Taddanpalle village of Medak district of Andhra Pradesh, situated 42 km northwest of ICRISAT Center, was initiated in 1981. It has provided a training site as well as a place for on-farm verification of the technology options. In the first year we observed that crop yields and profits obtained there were on par with the experience at ICRISAT Center. Using average prices for the past 6 years, the profits from the improved management of the watershed amounted to Rs.2800/ ha compared to Rs.1132/ha from traditional fields. The improved system thus generated a 147% increase in profits per hectare, or a 284% rate of return on the extra annual operational costs.

During the course of the on-farm verification of the technology options a number of policy issues have arisen that need immediate attention before the promise offered by the new technology can be regarded as a real potential for extension. These issues relate to the availability of regional adoptive research backup, farm power, construction of community drains, markets for new crops, additional credit requirements, supply of fertilizers and pesticides, availability of suitable farm machinery, and skill development in extension officers and farmers. Many of these questions relate to the development of infrastructural facilities in the dryland areas; some relate to cooperation between different wings of state departments of agriculture, and community and district development officers. We believed a two-way-dialogue between these agencies and the research staff will help evolve a strategy for widespread testing and transfer of the dryland technology in the next few years.

The Seminar, second in the series, was attended by senior officers from the Ministry of Agriculture, Government of India; from the states of Madhya Pradesh, Karnataka, Andhra Pradesh, and Maharashtra; from credit institutions; and from ICAR and ICRISAT. This summary of proceedings of the second 2-day Seminar documents the first-year experiences of the participant states with on-farm verification trials and outlines the future plans for Phase II (1983-86) of the Program.

I. INTRODUCTION

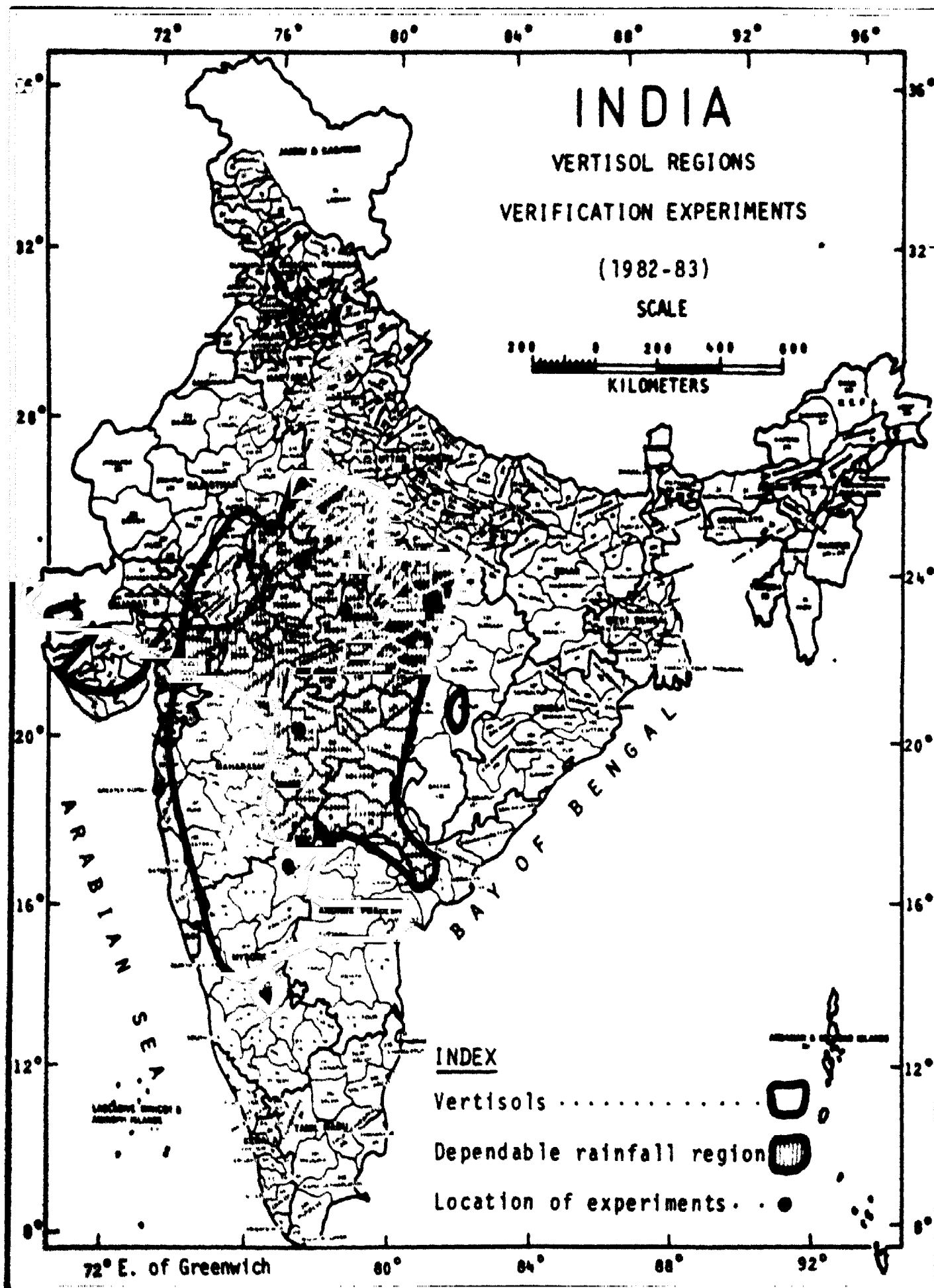
The Seminar was conducted to compare and exchange experiences gained in the various on-farm verification trials conducted or under way in the states of Andhra Pradesh, Karnataka, Madhya Pradesh, and Maharashtra as part of Phase-I (1981-83) of the action plan approved at the First Policymakers' Seminar held in Delhi on 21 May 1981. The Seminar was also intended to formulate specific proposals for the conduct of Phase II of the previously proposed action plan for the 1983-86 period. Thirtyeight officers (see Appendix II) from the states concerned and from ICAR, the Ministry of Agriculture, and ICRISAT attended the Seminar over 2 days, 10-11 September 1982 at ICRISAT Center, Patancheru. The Seminar also included field visits to the operational experiments on the Vertisol watershed at ICRISAT Center and to the on-farm research trials at Taddanpalle/Sultanpur, about 43 km northwest of Patancheru.

II. EXPERIENCES OF THE STATES WITH ON-FARM VERIFICATION TRIALS DURING 1981 AND 1982

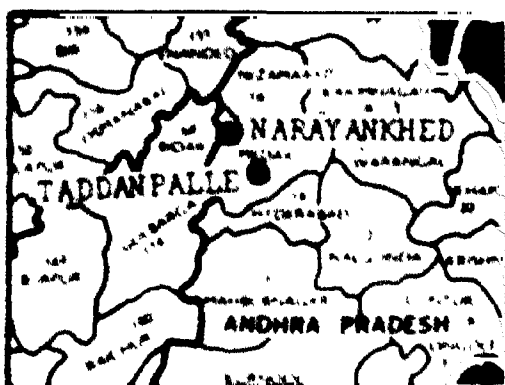
The Delhi Seminar in May 1981 recommended that a number of pilot on-farm verification tests of the technology options be carried out under a Phase-I program in 1981-83 with the following objectives:

- To verify whether the experience gained at ICRISAT Center could be replicated in farmers' fields.
- To evaluate the performance of the technology options.
- To test the ability of delivery systems to support demands of the improved technology options.
- To study the technical and economic performance of the options in real-world conditions.

The following is a summary of the Policymakers' views on the technology performance that they expressed in September 1982 meetings. The details of the test projects are given in Appendix I.



SOURCES: Murthy and Pandey (1978) DELINEATION OF AGRO-ECOLOGICAL REGIONS OF INDIA; IRRIGATION ATLAS OF INDIA (1972)



ANDHRA PRADESH

Two test sites are in operation in Andhra Pradesh. One is at Taddanpalle/Sultanpur villages, Medak district, 43 km northwest of ICRISAT Center, Patancheru.[†] The total area of the project is 35.24 ha and 25 farmers are involved. There are five kharif (rainy season) cropping systems but the dominant ones are sorghum/pigeonpea intercrop and fallow followed by chillies. The second location is at Narayankhed, 7 km south of the town. Total project area is 13.36 ha and includes seven farmers. The cropping systems are sorghum/pigeonpea intercrop and mung bean followed by safflower or chickpea.

Taddanpalle/Sultanpur

- Mung bean yields in 1982 ranged from 400 to 750 kg/ha. The average was 557 kg/ha, versus last year's average of 470 kg/ha. *Atriga* has been a problem on CSH-5 sorghum, but less so on SPV-386 sorghum and on maize. Farmers did not remove *atriga* because labor costs were high this year.
- Timely provision of credit from banks was a major problem in both 1981 and 1982. Crop production credit should be made more freely available for dryland crops at the level of at least Rs.700 800 per ha.
- Weed buildup was a problem. Is a fallow in the kharif necessary every second or third year to ensure control of weeds?
- A full subsidy may be required for community drains, as it is extremely difficult to apportion cost shares to beneficiaries. Those in the upper reaches where drains are smaller in dimension stand to gain less than those in the lower reaches where drain dimensions will be larger and also where the benefits from improved drainage will

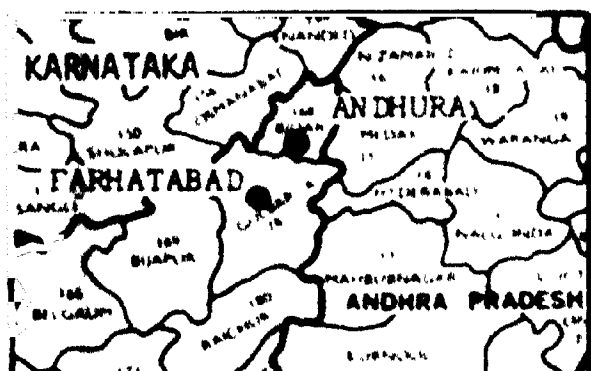
[†]Details about the Taddanpalle experience in 1981-82 are contained in the paper. J.G. Ryan, S.M. Virmani, and L.D. Swindale. 1982. Potentials and Challenges for Increased Income from Deep Black Soils in Relatively Dependable Rainfall Regions of India. Paper presented at the Seminar on Innovative Technologies for Integrated Rural Development, organized by the Indian Bank, 15-17 April 1982, New Delhi.

be greater. It would hence not be administratively feasible to charge differently for community drainage works and this is why a full subsidy may be desirable.

- Ensuring timeliness of operations such as weeding is difficult because of the competition from wetland paddy areas. It was suggested that in future such projects be concentrated in areas with minimal irrigation.
- Repairs and capital costs of the tool carrier were problems. Can we do without the tool carrier? Can we use local implements and perhaps use a bed 4-5 meters wide to reduce the need for a tool carrier?

Narayankhed

Dry sowing was completed by the first week of June. The State Bank of India has approved crop loans of Rs.865/ha for each participant farmer, and soil conservation staff have constructed common drains and waterways.



KARNATAKA

Two test locations are in operation in Karnataka: Farhatabad village in Gulbarga district, and Andhura village in Bidar district. There is another location in Bidar district at Belkumi village of which little information is available. In Farhatabad the watershed is 16.5 ha and includes two farmers. There are six cropping systems but the dominant one is mung bean followed by sorghum. In Andhura village the project area is 8.0 ha and includes only one farmer. The cropping system is a sorghum/pigeonpea intercrop.

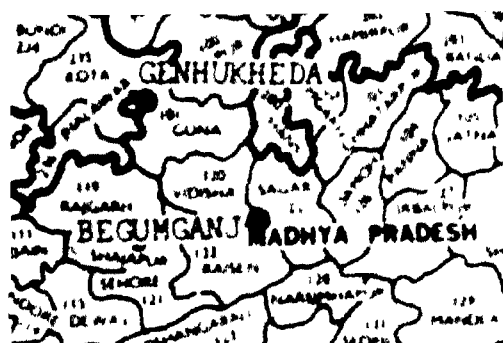
Farhatabad

Early drought after sowing caused some slight damage to crop stand; some resowing of crops was necessary. However, the harvest of mung this year has been good and above average. Maize is showing signs of water stress. Otherwise the crops look quite good and farmers are generally satisfied.

- There must be a contingency plan for seed and input supplies that can operate on short notice when the actual dates of onset of monsoon rains become evident.
- Is spraying of crops for insects better on a prophylactic basis or on an economic threshold basis? Questions were raised about the threshold method.
- The BBF system works very well, as does the tool carrier, although interculture in the wet soil is a problem. They plan to offer use of the tool carrier as a state-funded service.

Andhura

Crop conditions are good, even though sowing was delayed until after rains on June 22-26 and not at the scheduled dry sowing period of June 11-17. The BBF look very good and the farmer likes the tool-carrier, although he was not happy with the seed/fertilizer drill. Interculture was a problem as rains were continuous in July.



MADHYA PRADESH

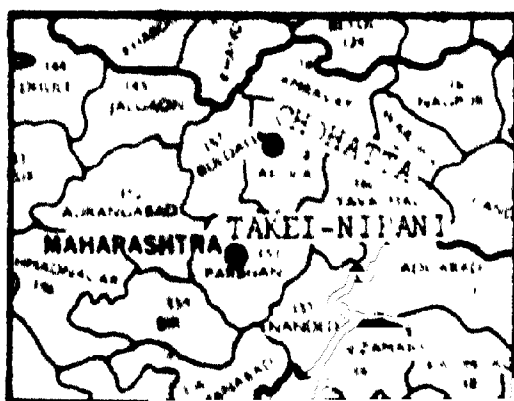
There are two technology test sites in Madhya Pradesh. One is at Genukheda village, Guna district. There is little information available at present on this project. The other test location with an area of 25.2 ha is at Begumganj village in Raisen district, 150 km east of Bhopal, and involves 10 farmers. The primary cropping systems are soybeans followed by safflower or chickpea, and sorghum/pigeonpea intercrop.

Begumganj

Because of continuous rains in July and August 1982 weeding and topdressing have not been possible. Crop yields are expected to suffer considerably if rains do not cease over the next few days. The prospects for post-rainy season crop look very good. The profile is fully charged with water.

The officers from Madhya Pradesh suggested the following:

- The broadbeds-and-furrows (BBF) were complicated for farmers to put in place. Can an intermediate technology using local implements be designed to improve drainage? With the heavy rains the BBF had silted up and the area is now almost flat. Is there a need for the raised bed?
- Early-sown soybeans sown deeper are suffering due to the long dry spell and poor germination. Later-sown soybeans are doing better although all are suffering from yellowing to some extent. The first flush of weeds adversely affected the soybeans, particularly those sown earlier. There was no apparent difference between soybeans on flat versus BBF system.
- The main drain has worked extremely well, as have the grassed waterways.
- It is doubtful if the whole package of practices can be successful although certain components like drainage-way and rainy season cropping will be important.
- Prices received by small and large farmers in the village itself should be used to assess the economic performance of the technology options. Often market prices do not reflect the differentials between prices received by small and large farmers.



MAHARASHTRA

Projects have been initiated at two test sites in Maharashtra. These are at Takei-Nipani village, Parbhani district, 50 km from Parbhani towards Sailu, and Chohatta village in Akola district. At Takei-Nipani the project area is 3.2 ha. Cropping systems include sole cotton, cotton/mung bean intercrop, sorghum/pigeonpea intercrop and mung bean/sorghum intercrop. At Chohatta village the project area is 9 ha and seven farmers are participating. Cropping systems include sorghum/pigeonpea intercrop, sole cotton, cotton/mung bean intercrop and mung bean followed by post-rainy season pigeonpea.

Takei-Nipani

- . Rainfall has been 300 mm to date, whereas normally it would be around 400 mm. The BBF have not performed as well as expected.

Chohatta

- . Cotton was dry-sown on June 17 but had to be resown due to late arrival of rains. White grub on pigeonpeas was a problem. There has been no rain since August 17. Total rainfall to date is 170 mm, whereas normally it is 400 mm. If it rains in September, postrainy sowing will be possible, otherwise not.
- . A major problem in Maharashtra is credit availability, with interest rates also being too high. Disbursement is only 15-20% of approved loans.
- . Officers in Maharashtra felt ICRISAT should be more involved in the projects, particularly in Akola.
- . The technology is expected to perform better in the Vidharba/Marathwada regions. The Marathwada Agricultural University will also be involved.

III. CONCLUSIONS FROM THE EXPERIENCES

- . The Vertisol technology options that have been under test in these verification trials have in general worked well.
- . Representatives from the various states accept the technology options as useful for specified regions.
- . During 1983-86, areas up to 5,000 ha could be introduced to the technology in the four states.
- . Improved drainage will be the first and the primary component in the future projects. Other components will be added in a phased manner.
- . NABARD will arrange refinance for the projects in Phase II. The economic performance and viability of the various projects will be assessed by the states and NABARD.
- . The Ministry of Agriculture will make recommendations to NABARD regarding the quality/feasibility of each of the projects submitted by the states. A question was raised about loans for previous defaulters and possible underwriting/guarantees by Govt. of India under these circumstances.

The Agricultural Field Officers of the banks who process loans in these dryland projects should be intimately involved at the field level in the management, processing, and monitoring of the projects. It is unreasonable and unwise to expect staff of Departments of Agriculture to devote the amount of time and effort they were required to in the Taddanpalle/Sultanpur projects to arrange for and to help process loans.

Criteria for selection of project sites should be kept in mind. Among the criteria are: (i) a regional research institution should be nearby to help design the project and to conduct adaptive research as required when local problems arise in the on-farm projects, (ii) sites should be accessible, (iii) a godown should be available or built at the village sites, (iv) work should begin at the lower end of the watershed and work back to the upland areas, (v) banks and/or cooperative movements should be strong, (vi) little irrigated land should be in the village or nearby, (vii) as far as possible areas requiring large cropping pattern shifts should be avoided, and (viii) farmers should be willing to participate in the project and not be coerced.

A continuous dialogue is required between the administrators of projects and field officers and staff.

Loans should be negotiated for both rainy season and postrainy season crops together within the same agricultural year to avoid problems of delays in processing of postrainy season crop loans when these are treated as separate from loans for rainy season crops. One loan with two disbursements would be preferable.

A strong and continuing link between these on-farm projects and a local regional research institution should be forged. It is not feasible or desirable that ICRISAT service all project areas although ICRISAT will be closely involved in provision of training and guidance. Local problems will arise which can only be addressed by local adaptive research.

Training of officers and staff at a three-tier level is essential. ICRISAT is willing to help in this. Training programs should embrace field staff of Department of Agriculture (agronomy, soil conservation) as well as research officers and staff of local research institutions.

A detailed soil analysis and classification survey is required at each site. Unless this is done it will not be possible to explain the results achieved at each project site and to extrapolate to a wider area.

- More research is required at the various sites to determine whether broadbeds and furrows are required and whether the wheeled tool carriers are necessary.

IV. FUTURE PLANS FOR PHASE II (1983-86)

The representatives of the participating states made the following suggestions as to their plans for Phase II of the program for the period 1983-86:

Andhra Pradesh

- The area under the technology will be expanded to 300 ha or more in Medak district.
- The NABARD representative mentioned that NABARD has approved refinance for Taddanpalle/Sultanpur and Narayankhed. Recoveries may not be required in full until year 4, including recoveries of crop loans if adverse seasons occur. Hiring charges for tool carriers and provision for family labor will be included in the loans to farmers, but no finance is recommended for purchase of tool carriers. Community drains must be funded by the state governments. Technical support by banks will be a problem.

Karnataka

- Initially an area of 500 ha will be developed and this will expand in a phased manner to about 5000 ha by 1986. Final area size will depend on availability of new funding and staff, and the ability to complete detailed soil and topographical surveys. Area will not necessarily be contiguous and locations will be selected on the basis of detailed rainfall analyses, but the most likely district will be Bidar.
- A new structure of agricultural administration will be required for this technology.
- The IRDP can be utilized for this program. Drainage and land smoothing will be key elements in the strategy.

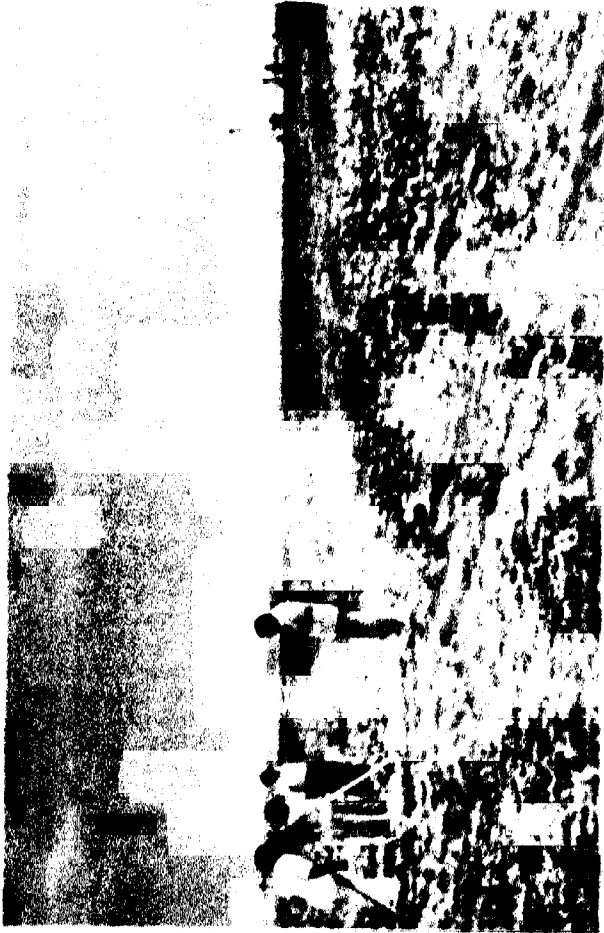
Madhya Pradesh

- 500-1000 ha will be taken up in a cluster of two or three villages, not necessarily in one contiguous area. This will involve about 100 watersheds.
- Research institutions in Madhya Pradesh must be involved in the project.
- The tool carriers will be hired out to farmers.

Maharashtra

- In seven districts 50-100 ha will be chosen for the projects in a phased manner.
- An attempt will be made to involve the universities, but identifying staff could be a problem.

SOME STEPS IN IMPROVED TECHNOLOGY



1. Surveying land for smoothing, contour cultivation and layout of drainage system



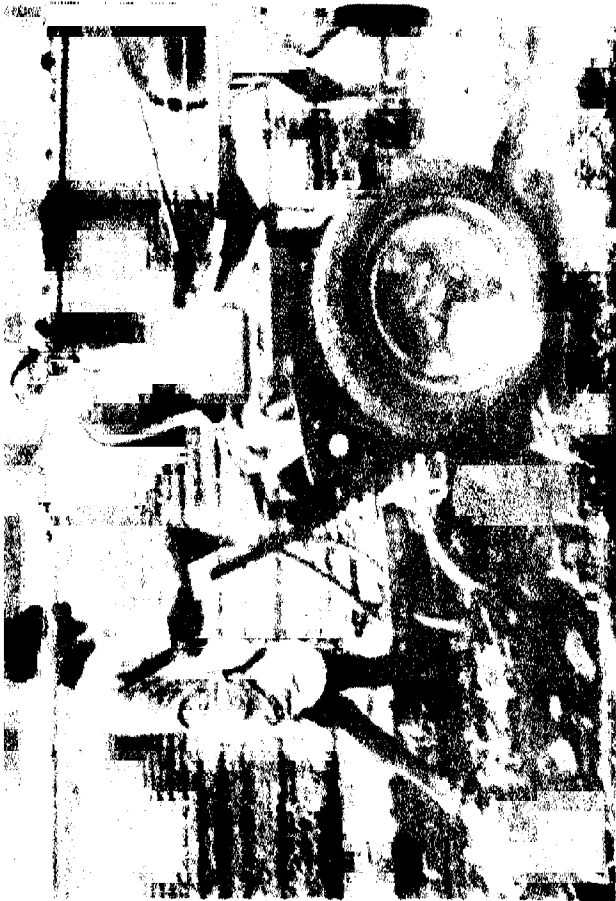
2. Laying out of Broad-beds and furrows with wheeled tool carrier



3. Cultivation in the beds to prepare land for planting



4. Dry seeding ahead of the machine



6. Intermittent cultivation for weed control and top dressing of fertilizers



7. Early sowing and post-planting irrigation



8. Intercrop of sorghum-pigeonpea



9. Harvesting of sorghum leaving behind a good crop of pigeonpea

Appendix I

Details of the Test Projects by State (See Map for locations)

A. Andhra Pradesh

1) Taddanpalle 1981

Area: 15.4 ha

No. of farmers: 14

Cropping patterns: See Table 1

Summary of economic returns: See Table 2

Table 1. Taddanpalle village: details of crops and practices 1981-82.

Cropping pattern	Date of sowing		Type of sowing	Area (ha)	Fertilizer		Seed rate (Kg/ha)
	Rainy season	Post-rainy season			N	P ₂ O ₅	
Sorghum/pigeonpea intercrop	3/6-8/6	-	Dry	7.41	50	40	Kh Sorg. 10
Maize/pigeonpea intercrop	3/6-6/6	-	Dry	0.80	73	67	
Maize-safflower sequence	3/6	14/10	Dry	0.80	65	67	Rb Sorg. 8
Maize-chickpea sequence	6/6	17/10	Dry	0.66	48	75	Maize 11
Mungbean-sorghum sequence	6/6	17/10	Dry	2.48	28	70	
Mungbean-safflower sequence	7/6	14/10	Dry	0.48	28	73	P.pea 7
Mungbean-(Sorg./C.pea) sequence	7/6	12/10	Dry	0.60	28	73	C.pea 50
Mungbean-chillie sequence	7/6	7/9	Dry	0.25	40	68	M.bean 10
Fallow-chillies	-	8/9	Dry	1.0	14	35	

Table 2. Economics of improved watershed-based technology options on deep black soils in Taddannalle village, Andhra Pradesh, 1981-82a

Cropping system	Proportions grown (%)	Gross returns	Operational costs	Gross profits	Yields		
					Cereals	Pulses/oilseeds/vegs.	Stalks
				Grain	Fodder	Grain	
							(Q/ha)
IMPROVED WATERSHED^b							
Sorghum/pigeonpea intercrop	50	4930	1092	3838	19.5	72	4.6
Maize/pigeonpea intercrop	6	4304	1395	2909	16.4	34	6.0
Maize-safflower sequence	6	2301	1190	1111	16.2	35	0.5
Maize-chickpea sequence	5	5097	1831	3266	22.9	50	4.6
Mung bean-sorghum sequence	17	3352	1261	2091	5.9	17	4.7
Mung bean-safflower sequence	3	3715	1321	2394			5.2 (mung bean)
Mung bean-(sorghum/chickpea) sequence	4	4073	1495	2578	0.8	2	7.3 (safflower)
Mung bean-chillies sequence	2	4625	1450	3175			4.8 (mung bean)
Fallow chillies	7	2551	734	1817			5.2 (chickpea)
	<u>100</u>						5.2 (mung bean)
							5.0 (chillies)
							4.1
Weighted averages							
		4242	1183	3059			
TRADITIONAL FARMERS' FIELDS							
Fallow-sorghum	90	2194	536	1658	6.7	18	
Fallow-chillies	4	3208	2036	1172			7.2
Mung bean-sorghum sequence	1	3964	1526	2438	9.7	24	3.1
Sorghum/pigeonpea intercrop	5	1544	310	1234	5.5	25	1.2
	<u>100</u>						
Weighted averages							
		2220	595	1625			

aPrices used were based on actual realized or market prices just after harvest. They were as follows:

Grain	Rs/q	Grain	Rs/q
Hybrid sorghum	298	Fodder	Rs/q
Postrainy season sorghum	300	Hybrid sorghum	20.0
Maize	450	Postrainy season sorghum	37.5
Mung bean	618	Maize	10.0
		Pigeonpea stalks	10.0

bData refer to 14.48 ha of the 15.42 ha watershed. In three plots data were not available.

2) Taddanpalle/Sultanpur 1982

Area: 35.34 ha

Number of farmers: 25

Cropping patterns: See Tables 3 and 4 for details.

Land preparation Land smoothing was done with a buck scraper. All other operations (plowing, bed formation, and seed and fertilizer application) were performed with the wheeled tool carrier.

Seed & fertilizers In 1982-83 the following rates were used:

	<u>Seed rates</u>	<u>fertilizer rates</u>
Sorghum/pigeonpea	8 kg/ha/7 kg/ha	18-46-0 100 kg/ha
Mung	10 kg/ha	18-46-0 100 kg/ha
Mung/pigeonpea	18 kg/ha/7 kg/ha	18-46-0 100 kg/ha

In some cases 100 kg/ha of 28-28-0 was used in place of 18-46-0. Top-dressing was done with urea to bring the total applied N to 60 kg/ha for maize and sorghum.

Crop stands Stands are generally satisfactory to good.

Rainfall Average annual rainfall at ICRISAT is about 750 mm. By the end of August, 1982 Taddanpalle/Sultanpur had received approximately 620 mm.

3) Narayankhed 1982

Area: 13.36 ha

Number of farmers: 7

Crops: Sorghum/pigeonpea, mung bean followed by safflower or chickpea

Land preparation : Agricarts were used to form the DBF and for harrowing, fertilizer application and sowing.

B. Karnataka

1) Farhatabad 1982

Area: 16.5 ha

Number of farmers: 2

Cropping patterns: See Table 5

Table 4. Taddanpalle and Sultanpur villages: details of crops and practices 1982-83.

Cropping pattern	Date of sowing	Area (ha)	Type of sowing	Fertilizer		Seed rate (Kg/ha)
				N	P ₂ O ₅	
<u>Taddanpalle</u>						
Sorghum/pigeonpea intercrop	17/6	3.45	Wet	60	40	Kh Sorq. 8
Mung bean-sorghum sequence	14/6	2.23	Dry	18	46	Pineonpea 7
<u>Sultanpur</u>						
Sorghum/pigeonpea intercrop	17/6- 21/6	13.5	Wet	60	40	Maize 12
Mung bean/sorghum intercrop	17/6- 21/6	3.0	Wet	18	46	Mung bean 10
Maize-pigeonpea sequence	15/6- 17/6	13.5	Wet	60	40	

Land preparation Postharvest plowing: tractor and wheeled tool carrier.
Land smoothing: buck scraper.
Red formation: wheeled tool carrier.
Seed and fertilizer operations: wheeled tool carrier.

Seed & fertilizer & crop stands See Table 4.

Rainfall Average annual rainfall for this area is 727 mm (79 years average). By August 16, 1982, only 262 mm had been received.

Table 5. Farhatabad village, Gulbarna district: details of crops and practices in 1982-83.

Cropping pattern	Date of sowing	Type of sowing	Area (ha)	Seed rate (Kg/ha)	Fertilizer		Date of emergence (1982)	Crop stand
					N	P ₂ O ₅		
<u>Field No.1 (Farmer: K Shivshernappa)</u>								
Mung bean (Sole)	4/6 to 13/6	Dry	6.15	9.1	16.2-41.4		20/6	Good
Blackgram (Sole)	4/6 to 13/6	Dry	0.5	10.0	18.0-46.0		21/6	Poor
Pigeonpea (Sole)	19/6	Wet	0.85	12.0	15.8-40.4		26/6	Good
Maize/pigeonpea	19/6	Wet	0.35	17.0 (M) 7.0 (PP)	15.4-39.5		25/6	Good
G.nut/p.pea	20/6	Wet	1.85	30.0 (GN) 12.5 (PP)	14.5-37.2		26/6	Excellent
Sesamum/p.pea	21/6	Wet	0.25	4.0 (S) 12.0 (PP)	14.4-36.8		25/6	Excellent
<u>Field No.2 (Farmer: K Shantappa)</u>								
Mung bean (Sole)	18/6	Wet	1.52	9.2	10.8-27.6		22/6	Medium

2) Andhura 1982

Area: 8.0 ha

Number of farmers: 1

Cropping patterns: Sorghum/pigeonpea

Land preparation: BBF was laid out with the wheeled tool carrier.

C. Madhya Pradesh

1) Benumgani 1982

Area: 25.2 ha

Number of farmers: 10

Cropping patterns: Rainy season Sole soybeans (15.0 ha)
Soybean/pigeonpea intercrop (1.2 ha)
Sorghum/pigeonpea (9.0 ha)Postrainy season Depending on moisture conditions:
wheat, chickpea, safflower, pigeonpea

Date of sowing: June 1982. Resowing of portion: July 1982

Land preparation: Postharvest cultivation: by tractor.
Land smoothing: 50% tractor, 50% bullock-powered scraper.
Bed formation: Largely by tractor.
Planting: 50% by wheeled tool carrier, 50% by tractor-drawn seed drill (mostly soybeans)Seed & fertilizers

Seeds	Fertilizers
Soybeans JS2 or JS7244 100 kg/ha	8-32-8 100 kg/ha
Sorghum CSH-5 10 kg/ha	28-28-0 100 kg/ha
Pigeonpea Type 21 (local) 15 kg/ha	

No N-topdressing was possible on sorghum because of continuous rains.

Crop stands:

Stands are generally good where crops were planted by animal-drawn tool carrier. Tractor-planted areas are poor because seeds were not covered well and good soil seed contact was not established. This was exacerbated by a 3-week drought after planting.

Rainfall:

Average annual rainfall in Begumganj is about 1300 mm (30 year average) Most of it usually occurs between late June and mid-September. This year about 1,100 mm had fallen by 25 August.

2) Genhukheda

Area: 6.0 ha (approximate)

D. Maharashtra

1) Takei-Nipani

Area: 3.2 ha

Crop: Cotton sole (SRT 1)
2 Cotton/1 mung bean (T 9)
2 Sorghum (CSH 9)/1 pigeonpea (BDN 2)
Mung bean-sorghum

Land preparation

Wheeled tool carrier was used to form BBF on a 0.4% grade. Dry sowing was completed in mid-June.

Comments

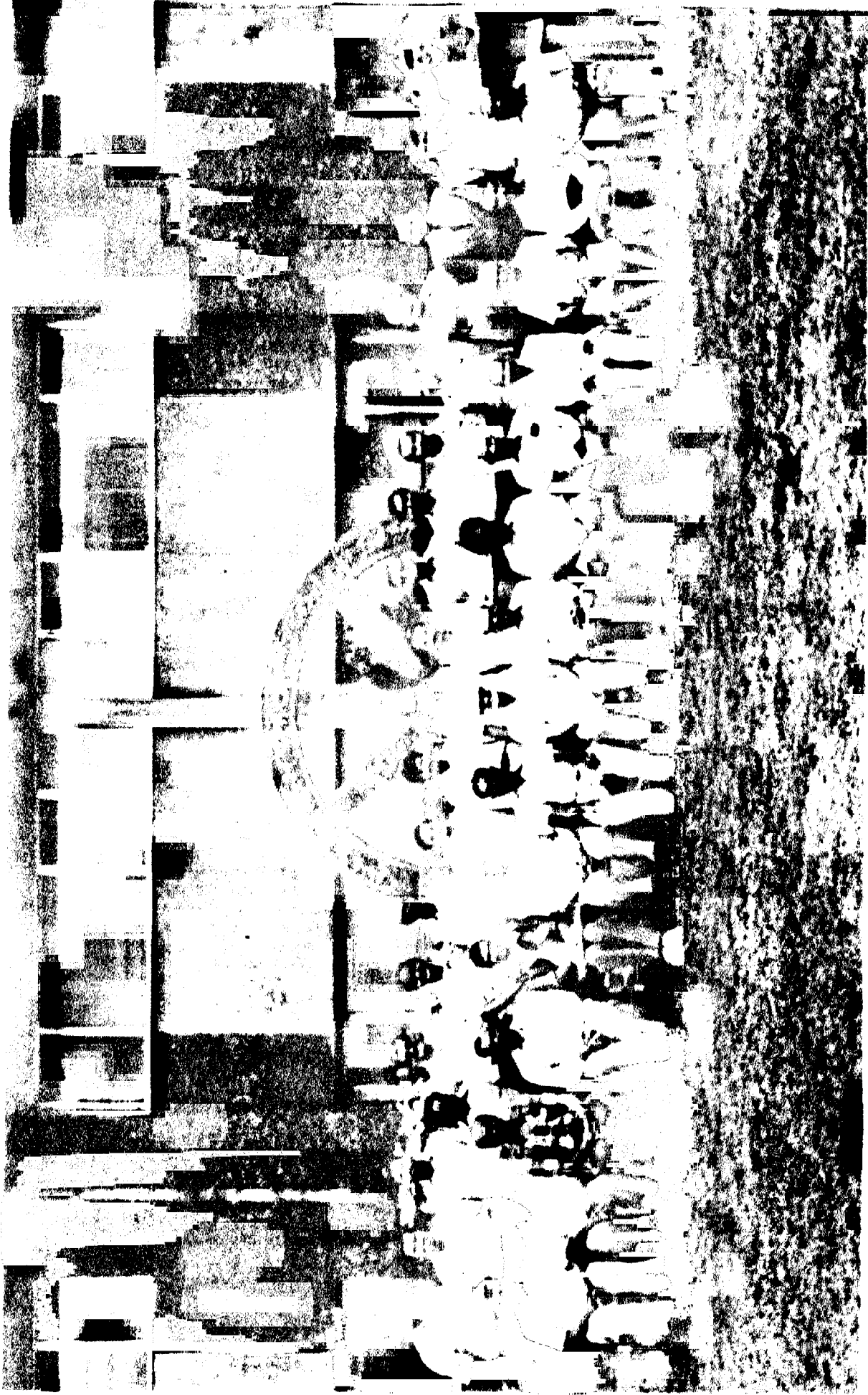
Rainfall has been 300 mm to date, whereas normally it would be 400 mm. The BBF have not performed as well as expected.

2) Chohatta

Area: 9.0 ha

Number of farmers: 7

Crops: 2 sorghum (CSH 5)/1 pigeonpea (C11)
Cotton sole (SRT 1)
Cotton/mung bean
mung bean-postrainy season pigeonpea



SECOND POLICYMAKERS' SEMINAR TO REVIEW THE PROGRAM OF THE IMPROVED VERTISOLS MANAGEMENT IN RELATION TO

ASSURED RAINFALL REGIONS OF INDIA

ICRISAT, PATANCHERU, 10-11 SEPTEMBER 1982

APPENDIX II - LIST OF PARTICIPANTS

MINISTRY OF AGRICULTURE

1. Mr. A.C. Garg
Joint Commissioner (Projects)
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Ministry of Agriculture
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2. Mr. E.V. Naidu
Dte. of Millets Development
Government of India
Madras
3. Mr. M.D. Wasnik
Director
Dte. of Oilseeds Development
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OFFICERS FROM THE STATES

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1. Mr. A.K. Agarwal
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2. Mr. G.S. Sachdev
Joint Director of Agriculture (Soil Cons.)
Directorate of Agriculture
Bhopal
3. Mr. Bhupendra Singh
Director of Agriculture
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Bhopal

Karnataka

4. Mr. Shantanu Consul
Deputy Commissioner
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5. Mr. T.P. Issar
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Dept. of Agric. & Animal Husbandry
Government of Karnataka
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6. Mr. Arvind Jadhav
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CADA for Upper Krishna Project
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10. Mr. V. Umesh
IAS Probationer
C/o. Deputy Commissioner
Bidar
11. Mr. M.R. Vijayakumar
Asst. Commissioner
Gulbarga

Andhra Pradesh

12. Mr. M. Gopalakrishnan
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14. Mr. R. Raghupati Rao
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Sangareddy

15. Mr. A. Rajendra Rao
Dy. Director of Agriculture
Soil Conservation
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16. Mr. M. Vithal Rao
Asst. Director of Agriculture
C.S.I. Church Compound
Medak
17. Mr. B. Krishna Reddy
Asst. Director of Agriculture
Sangareddy
18. Mr. K. Subramanyam
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Dept. of Forests & Rural Development
Govt. of Andhra Pradesh
Hyderabad
19. Mr. Syed Hashim Ali
Agricultural Production Commissioner
Govt. of Andhra Pradesh
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Maharashtra

20. Dr. S.K. Dorge
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21. Mr. S.B. Pande
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Parbhani
22. Mr. J.Y. Patil
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Govt. of Maharashtra
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Akola

NABARD/CREDIT INSTITUTIONS

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1. Dr. L.D. Swindale
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3. Mr. S.S. Dhanoa
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Principal Govt. Liaison Officer
4. Dr. S.M. Virmani
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Farming Systems Research Program

5. Dr. J.G. Ryan
Principal Economist
Economics Program
6. Dr. D.L. Oswalt
Principal Training Officer
Training Program
7. Dr. S.M. Miranda
Principal Scientist
Land & Water Management
Farming Systems Research Program

APPENDIX III - PROGRAM OF MEETING**SECOND POLICYMAKERS' SEMINAR TO REVIEW THE PROGRAM OF IMPROVED VERTISOL
MANAGEMENT IN RELATION TO ASSURED RAINFALL REGIONS OF INDIA**Friday 10 September 1982

0900	Participants arrive at ICRISAT Center and assemble in the Foyer of Administration Building	- S.S. Dhanoa
0900	Registration	- D.L. Oswalt
0930	Welcome - Slide presentation on mandate and research at ICRISAT - Venue: Auditorium	- L.D. Swindale
1015	TEA	
1040	Field visit to operational scale watersheds at ICRISAT	- S.M. Virmani
1230	LUNCH	
1400	Video on Taddanpalle	- D.L. Oswalt
1430	Visit to Taddanpalle/Sultanpur watersheds Demonstration of survey methods for watershed work: Survey of India	- N.A. Naidu & Staff of Directorate of Agriculture, A.P.
1930	DINNER	

Saturday 11 September 1982

0900	Economics of components of deep black soils technology and policy issues Venue: Training Classroom	- J.G. Ryan
1030	TEA	
1100	Experiences of the field staff/officers currently involved with evaluation of the technology - Venue: Training Classroom - Andhra Pradesh - Karnataka - Madhya Pradesh - Maharashtra - Discussion	S.M. Virmani J.G. Ryan D.L. Oswalt
1230	LUNCH	
1400	Action Plan for 1983-86	- T.P. Issar