Sustainable Productivity Enhancement Initiatives in India

Proceedings of Tata-ICRISAT-ICAR Projects' Review and Planning Meeting

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International Crops Research Institute for the Semi-Arid Tropics

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Acknowledgement

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Organizing Committee

Chair:	SP Wani
Co-chairs:	A Subba Rao SD Kulkarni
Members:	Somnath Roy KL Sahrawat KNV Satyanarayana

Local Organizing Committee

Co-chairs:	A Subba Rao SD Kulkarni
Members:	AK Mishra Somnath Roy S Kundu D Damodar Reddy K Sammi Reddy AK Tripathi J Somasundaram

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Editors
SP Wani, P Pathak and KL Sahrawat

12-13 May 2009
Indian Institute of Soil Science (IISS)
Bhopal, Madhya Pradesh, India

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International Crops Research Institute for the Semi-Arid Tropics
Patancheru 502 324, Andhra Pradesh, India

Sir Dorabji Tata Trust (SDTT)
Sir Ratan Tata Trust (SRTT)
Homi Modi Street, Mumbai 400 001, India

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12-13 May 2009
Indian Institute of Soil Science (IISS)
Bhopal, Madhya Pradesh, India

The review and planning meeting was held for the SDTT-ICRISAT-ICAR and SRTT-ICRISAT-ICAR projects whose background, objectives and target regions are described in this report.

SDTT-ICRISAT-ICAR Project: Improving Rural Livelihoods and Minimizing Land Degradation through the Community Watershed Approach for Sustainable Development of Dryland Areas

Background

Out of the 852 million poor worldwide, 221 million are in India. The country must increase its food production to 250 million tons to feed a population of 1.2 billion people by 2010. Two-thirds of Indian agriculture is largely dependent on rainfall, and current productivity of the rain-fed agriculture is quite low (1 to 1.5 t ha^{-1}) as against a potential of 2.5 to 7.0 t ha^{-1}. Rain-fed areas are also impacted by poverty, land degradation, malnutrition and water scarcity. The initiative of the Tata-ICRISAT-ICAR project during 2002 to 2007 demonstrated the power of science-led development model for improving agricultural productivity and incomes of the rural poor in India. To meet the millennium development goal (MDG) of halving the number of poor people by 2015, and to meet the challenges thrown by global warming by greenhouse gas emission, coordinated, effort is urgently needed to apply science for a sustainable development in rain-fed areas. Sir Dorabji Tata Trust (SDTT) provided support to ICRISAT to implement an innovative pilot project to develop and validate a farmer-centric community watershed development approach for combating land degradation, which has opened up new vistas for sustainable development in the rain-fed areas. The proposed approach to up-scale the benefits from the first phase of the SDTT-ICRISAT-ICAR project by consolidating the benefits at the nucleus

watersheds in three districts and through empowerment and capacity development to enable up-scaling of the model at the ecoregional level. The second phase for improving rural livelihoods and minimizing land degradation through the community watershed approach for sustainable development, is proposed here. The targeted ecoregion, with assured rainfall and with medium water-holding capacity soils, in the central highlands of Madhya Pradesh and eastern Rajasthan, is selected for upscaling the benefits.

Workshop Objectives

1. To consolidate the science-led farmer-centric community watershed approach at the nucleus benchmark watersheds to enhance productivity, and to reduce land degradation in these three districts and to use these sites as the centers of learning for scaling-out the benefits across the three target districts;
2. To scale-out the benefits of productivity enhancement and community watershed management with technical backstopping in the target agro-eco-region of Madhya Pradesh. (7+1 districts) and Rajasthan (7+1 districts); and
3. Capacity-building of lead farmers, development workers, and consortium partners in the target region, and provide technical support to the development agencies in the area of Community Watersheds.

Target Ecoregions

The target eco-region for this project is the dryland areas of Madhya Pradesh and eastern Rajasthan with assured rainfall, with medium water-holding capacity soils (Figure 1). The rainfall in Madhya Pradesh varies from 770 to 1690 mm per year; soils are predominantly black soils (Vertisols and Vertic Inceptisols) and loamy Alfisols varying in soil depth. The length of growing period (LGP) varies from 90-180 days and in some cases extends up to 210 days. Major crops grown in the region are soybean, sorghum, maize, rice, pigeonpea, wheat, and chickpea. In eastern Rajasthan covering the districts of Alwar, Banswara, Bhilwara, Jhalawar, Sawai Mathopur and Tonk, the soils are red and black with the rainfall varying from 660 to 1025 mm per annum. The LGP in eastern Rajasthan varies from 90 to 150 days and the main crops

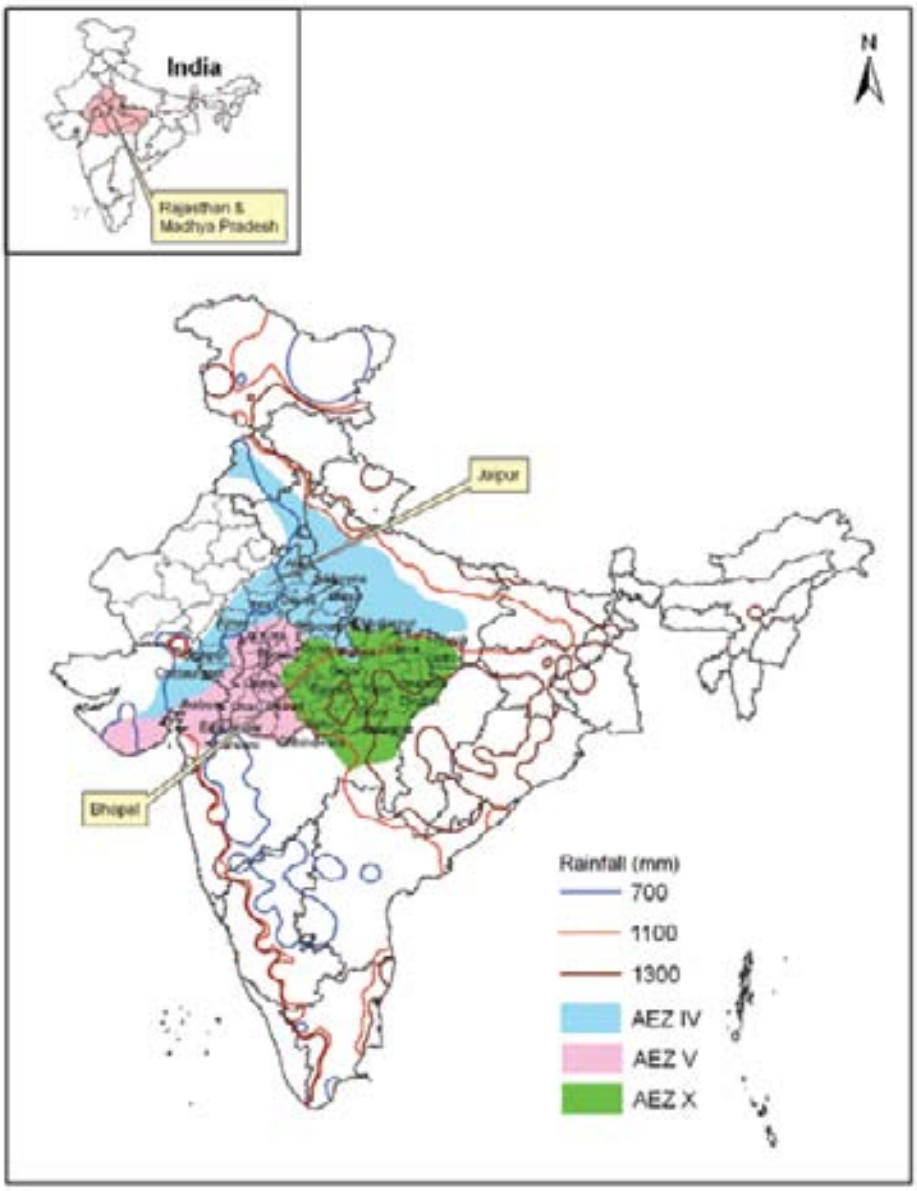


Figure 1. Target ecoregion of Madhya Pradesh and eastern Rajasthan: agro-ecozones, soils and rainfall in the region.

grown are pearl millet, sorghum, maize, wheat, chickpea, mustard and sesame. The LGP in the central highland of Madhya Pradesh varies between 150-180 days, extending up to 210 days in some cases; soils are predominantly red and black. Proposed contiguous districts for scaling-out activities for productivity enhancement are Rajgarh, Shajapur, Sehore, Raisen, Vidisha, Indore and Badwani, in addition to Guna. This eco-region has the potential to grow two crops (200 per cent cropping intensity) with supplemental irrigation during the post-rainy season. However, irrespective of this only 120 to 130 per cent cropping intensity is achieved in Madhya Pradesh. The groundwater table is depleting every year and at the same time causing severe land degradation. In Madhya Pradesh due to perceived fear of waterlogging and risk of reduced yields of the post-rainy season crops, farmers leave two million ha land fallow during the rainy season.

SRTT-ICRISAT-ICAR project: Increasing Agricultural Productivity of the Farming Systems in parts of Central India through participatory Research-cum-Demonstrations and Knowledge Sharing Innovations.

Introduction

The problem of soil erosion and waterlogging due to high intensity and high rainfall is severe in Madhya Pradesh where black soils are predominant, large portions of the land are kept fallow during the rainy season and in some areas chickpea or wheat is grown during the post-rainy season on stored soil moisture with or without supplemental irrigation. In the rainy season, farmers keep their lands fallow – to the extent of 16456 ha in the two districts of Madhya Pradesh – inspite of fertile soils and assured rainfall. Similarly, after harvesting the rainy season rice crops, in one eastern district of Madhya Pradesh and other extensive areas of Jharkhand are kept fallow, although sufficient moisture remains in the soil for growing a post-rainy season crop. Nutrient depletion is a common problem across these rain-fed areas. Great potential, during the rainy season as well as during the post-rainy season, is left untapped due to the ignorance of farmers about new soil, water, nutrient, and crop management practices and due to lack of availability of seeds of improved cultivars. The resource-poor farmers are neither in a position to invest in NRM technologies, nor have the

capacity to invest in the long-term maintenance of soil fertility as they struggle to fulfill their short-term needs of food and clothing

Therefore, efficient management and conservation of natural resources in the rain-fed areas of MP and Jharkhand assume much significance. The integrated livelihoods framework for increasing agricultural productivity, incomes, and sustainable use of natural resources by adopting the participatory and holistic farming system approach is essential. In target districts, the productivity enhancement measures available through the integrated water resource management (IWRM) approach (for increasing productivity of rain-fed systems), is quite feasible through participatory-cum-development research for fulfilling the goal of enhancing the overall productivity of farming systems.

Target Ecoregions

The target districts for pilot scale interventions are Saraikela Kharsaw and Gumla in Jharkhand and Jhabua and Mandla in Madhya Pradesh. Annual rainfall in Jharkhand varies from 1000-1600 mm, while in Madhya Pradesh it varies from 600 to 1600 mm. About 70-80 per cent of the annual rainfall is received during the southwest monsoon period (June-September). Soils are predominantly black (Vertisols, Vertic Inceptisols), as well as Entisols and Alfisols varying in soil depth. Jhabua and Mandla districts receive annual rainfall of 885 and 1580 mm, respectively, while Gumla and Saraikela Kharsaw receive 1100 and 1400 mm rainfall, respectively. These districts in general are dominated by an agrarian economy. Jamshedpur is also known for its industrial development. The major area in these four target districts falls in the AESRs i.e., 5.2, 10.4, 11, 12.1 and 12.3. Length of growing period (LGP) varies from 120 – 240 days in the target eco-region (Fig 2). Temperatures of above 45 °C are common in the summer months, while in winter, they could be as low as 10 °C.

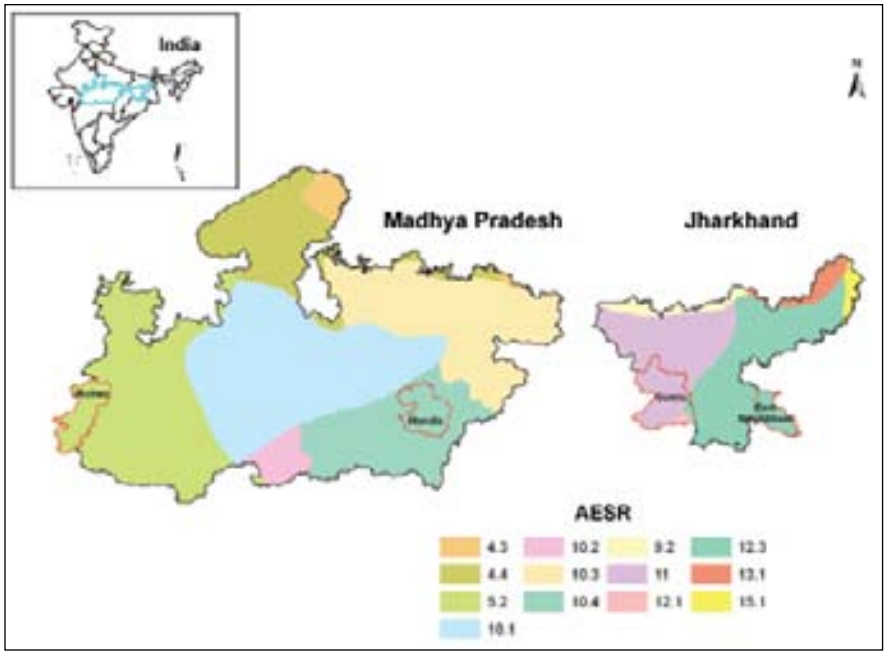


Figure 2. Target eco-region of Madhya Pradesh and Jharkhand: AESR and districts.

Objectives

The overall objective of this project is to increase the impact of the development projects in central India through technical backstopping and empowerment of stakeholders to improve livelihoods through increased agricultural productivity and livelihood opportunities via sustainable use of natural resources.

The specific objectives of this technical assistance program are:

- To establish a holistic participatory IGNRM model for the convergence of activities in four nucleus clusters (five villages in each cluster) encompassing suitable technical, institutional, gender equity, and policy options for enhanced agricultural productivity and crop-livestock management systems to alleviate poverty; and
- To provide technical know-how to farmers, landless rural people in the target districts, and partner NGOs supported by the SRTT in the region through empowerment by bringing together learnings from national and international experience.

Inaugural Session

Chair: *Dr A Subba Rao*
Rapporteur: *Dr Piara Singh*

Dr KL Sahrawat welcomed the participants of the Sir Ratan Tata Trust (SRTT) and Sir Dorabji Tata Trust (SDTT) projects and also the Directors of IISS and CIAE for hosting the workshop. He described the objectives of the workshop as follows:

- to review the progress and synthesize the findings from the work done at different locations under SRTT and SDTT projects;
- to identify emerging issues, discuss up-scaling strategies, and prepare workplans for sustainable use of natural resources and increasing productivity in India.

Mr Kiran Petare presented the CInI initiative of SRTT for the sustainable management of natural resources and improved livelihoods. He mentioned that CInI is the result of an earlier IWMI-Tata project and has six thematic areas of the initiative. The two major crop-based/ cropping systems viz. *kharif* paddy and *kharif* maize stabilization are more relevant to the current projects, which need to be pursued.

Dr S P Wani made presentation on increasing agricultural productivity of farming systems through participatory research and development and knowledge sharing. He discussed the emerging challenges to food security, physical and social environment and human health in the 21st century. He mentioned that two Tata-ICRISAT-ICAR projects are targeting hot spots of poverty in India with the Integrated Genetic Natural Resource Management (IGNRM) approach to address the problems of increasing productivity without degradation of the natural resources and environment. He described the role of farmer centered watersheds as the entry point for improving rural livelihoods in India. He discussed the role of various interventions made in the watersheds in Karnataka and Andhra Pradesh to enhance productivity and improving livelihoods of the people. Some of the key results presented from the various trials conducted during last cropping season in different states included:

- soil in most of the project target areas were found deficient in secondary and micronutrients viz. S, B and Zn;
- majority of the soils were also found low in organic matter and deficient in primary nutrients;
- in Madhya Pradesh, the improved system increased the soybean yields by 16-44% over the farmers' practice;
- excellent response to micronutrients were obtained in several crops viz. soybean, chickpea groundnut, blackgram and others;
- seed priming of chickpea was found very effective in increasing the germination and establishment of the crop and reducing soil borne diseases in Saraikela district of Jharkhand;
- KAK-2 variety of chickpea performed best in Gumla district of Jharkhand and gave the highest yield of 1600 kg ha^{-1};
- initial response to vermicompost application was found quite good in the project target regions;
- new broadbed and furrow maker was developed and tested in the farmers' fields. It was found acceptable by most of the farmers;
- a system of torpicultor operation with tractor was also found acceptable to farmers for BBF making.

He presented the various capacity building activities viz. trainings, exposure visits, farmers field days and others, which were conducted in various districts of Madhya Pradesh and Jharkhand. Finally, he thanked the donors for their support in implementing the watershed works.

Dr A Subba Rao briefly described the activities of IISS and presented its work experiences in the farmers' fields. Some of the key results and their possible benefits in improving the agricultural productivity were highlighted. He discussed the various soil management options, which can be used to improve soil health and agricultural productivity. The use of some of the industrial wastes in increasing agricultural productivity was presented. He mentioned that his institute has developed soil based improved agricultural practices for different agroclimatic regions of India. He highlighted the need to use balanced nutrient management for increasing agricultural productivity. He mentioned that IISS can associate and complement the works of the Tata-ICRISAT-ICAR projects so that the IISS findings can be taken to the farmers' fields.

Dr Wani thanked the IISS Director for offering his help and participation in the projects. He highlighted the power of consortium and joining hands to work together in improving the agricultural productivity and livelihoods of the farmers. He appreciated the help of Dr DLN Rao for agreeing to provide Rhizobium culture for the cultivation of 1000 ha of soybean. Dr Wani thanked Dr A Subba Rao and Mr Somnath Roy for their contribution in organizing this workshop at IISS, Bhopal.

Technical Session I

Chair: *Dr DLN Rao*
Rapporteur: *Dr DH Ranade*

In this session three progress reports were presented by Mr JP Sharma BAIF, Mr AS Yadav, BYPASS and Mr Yaseen Khan, CARD.

Steps towards agricultural development with assistance of Tata-ICRISAT-BAIF by Somnath Roy: On behalf of BAIF, Madhya Pradesh, Mr JP Sharma made this presentation. He first gave the general information about the project sites viz. total number of villages, districts, participants and area. The baseline information of project villages/ districts was also presented. The field level activities taken up during 2008-2009 were described in detail. The crop yield data from the INM and varietal trials were discussed for both *kharif* and *rabi* seasons. In addition to grain yields the data on plant population, the number of nodules per plant, plant height and other crop parameters were also presented and discussed. The exposure visit, farmers' field days, farmers meetings and trainings were organized to improve the capacity of farmers and NGO staff.

Sustainable livelihoods through community watershed approach in Raisen and Sagar districts of Madhya Pradesh by Mr Akhilesh Singh Yadav: Mr Yadav presented the social and area profile of the project villages in Sagar and Raisen districts. He discussed various interventions, which were taken up during the *kharif* and *rabi* seasons. The yield data were presented and discussed for both districts. He also presented the farmers perceptions/observations about the various improved technologies. The capacity building activities viz. farmers'

trainings, exposure visit, and farmers' meetings were taken up and presented. He also gave list of equipment viz. BBF maker, weighing machine and efficient irrigation equipments, which are needed to improve the effectiveness of scaling up of the technologies and data collections.

CARD Progress report on productivity enhancement in Madhya Pradesh by Mr Vivek Sharma: Mr Sharma first spoke about his organization CARD. He mentioned that his organization's vision is "empowered communities and self sustained habitats". Currently, his organization is working in several districts of Madhya Pradesh and Chhattisgarh. For the Tata-ICRISAT project, the baseline data have been collected. He mentioned that several activities viz. PRA and baseline survey of five villages, distribution of improved seeds, income generating activities, formation of seed bank, fodder production and capacity building activities were taken up. Good results have been obtained from these activities. The concept of vermicompost has been demonstrated to villagers. Several capacity building activities were taken up both for the farmers and project staff. Finally, he spoke about a few problems faced in the project execution during the first year. He also presented the application of advanced technology "GIS based planning and mapping of project area" with assistance from M/s Suzlon. Excellent baseline maps of the project area have been prepared and presented. This was highly appreciated by the participants.

These presentations were followed by good discussions. It was suggested that other component activities, which were not been covered should also be included in the 2009-10 workplans. It was also informed that BBF system brought new area under cultivation, which was otherwise left fallow during *kharif* due to waterlogging. It can be adopted without much problem.

In the end, Dr DLN Rao, Chairman, congratulated all the speakers for their presentations. He also suggested that all the partners should develop baseline/village maps as prepared by CARD.

Dr Wani proposed the vote of thanks.

Technical Session II

Chair: *Dr PK Mishra*
Rapporteur: *Mr Prabhakar Pathak*

The key points from various presentations and the discussions held during this session are as follows:

GVT progress report on productivity enhancement in Jhabua, Madhya Pradesh: Mr Kumar Sharma presented the biophysical and social constraints of the Jhabua district. He explained the rainfall pattern, topography, soil type and major cropping systems of the area. He expressed that there is excellent scope of doubling the agricultural productivity in the district. He described the various activities, which were undertaken under the Tata-ICRISAT project during 2008–09. Results from the integrated nutrient management trials in the *kharif* and *rabi* seasons were discussed. Good response to nutrients was obtained in paddy, soybean and maize in the *kharif* season and gram and wheat in the *rabi* season. Other activities undertaken were also explained. The exposure visits, farmers field days and capacity building related activities were also undertaken. Results from some similar programs viz. NABARD Wadi, and Gregs watershed were also discussed.

FES progress report on productivity enhancement in Mandla, Madhya Pradesh: Mr Sanjay Kumar Chaudhary gave brief presentation about his organization, FES (Foundation for Ecological Security). He mentioned that his organization works towards the ecological restoration and conservation of the land and water resources. The activity by FES is in five eco-regions with 1200 village institutions in 24 districts of six states in India. The FES is currently working on watershed programs in seven *gram panchayats* covering about 700 ha of land. The watershed activity primarily includes construction of farm ponds, fodder production, field bunding, revegetation of the common lands and introduction of economically lucrative crops. The main focus has been on strengthening the livelihoods portfolio of farmers. He also presented progress of various activities under Tata-ICRISAT project in Mandla district. The exposure visit of farmers to ICRISAT and farmers field days were organized for the best agricultural practices. The soil testing of stratified farmers' fields has been done. He expressed that in

the coming cropping season, more productivity enhancement activities will be undertaken under the Tata-ICRISAT project.

DEEP progress report on productivity enhancement in Rajasthan: Mr Bachchu Singh Chaudhary presented the progress on various activities of the Tata-ICRISAT project during 2008-09. He described the key features of the two project districts viz. Tonk and Sawai Mathopur in Rajasthan. The major crops/cropping system, land use systems and other details were discussed. The results from the INM, improved crop varieties and fodder trials were highly encouraging, and about 9-30% increase in crop yields were obtained due to improved technologies. The use of sprinklers on vegetable cultivation in summer gave highly encouraging results. The exposure visits, farmers' field days and other capacity-building activities were undertaken.

TSRDS progress report on productivity enhancement in Seraikela, Jharkhand: Mr Abhishek Kashyap first presented about the SRTT-CInI project at Saraikela, Jharkhand, which was initiated in 2004 in 16 villages. He presented the objectives of the project and other details. The demographic details and other socio-economic features of the area were discussed. The high yielding varieties were introduced, which gave good results both in the *kharif* and *rabi* seasons. He also presented the Tata-ICRISAT initiative with TSRDS. Under this project, the improved varieties of black gram and pigeonpea gave good results. The experience with groundnut and chickpea was also highly encouraging. Other activities taken up under this project, were nursery raising of Gliricidia, installation of rain gauge, and growing three crops with irrigation. Exposure cum training programs were organized on improved agricultural practices.

BAIF Progress report on productivity enhancement in districts of Rajasthan: Mr DP Tiwari, BAIF, Rajasthan, made the presentation. He first presented the demographic details of the new project districts in Rajasthan, which were taken under the Tata-ICRISAT project. He described the various activities to improve the productivity and rural livelihoods and their impacts in the various districts. The activities related to fodder production during the summer were highlighted. He discussed the various interventions, which were taken to improve the

animal productivity and their impact. The details of the exposure visits, trainings, and other capacity building activities were also presented. The project news coverage in newspapers and other media were also covered. Finally, the targets achieved during 2008-09, and the tentative workplans for 2009-10 were discussed.

These presentations were followed by good discussions. The issue of integrated approach was discussed in detail. The approach which needs to adopt in the tribal areas were also discussed. Low cost and simple interventions need to be emphasized for the poor farmers especially in the tribal areas.

Technical Session III

Chair: *Dr SP Wani*
Rapporteur: *Mr G Pardhasaradhi*

In the absence of Dr Bhaskar Mitra, Dr SP Wani chaired this session and Mr G Pardhasaradhi was the repporteur. In this session total three presentations were made.

Scientific Interventions in Management of Vertisols for Enhanced Crop Productivity and Input Use Efficiency – IISS Experiences: Dr A Subba Rao spoke about strengthening the collaboration between IISS and Tata-ICRISAT-ICAR projects. He discussed about the Vertisols and its physical constraints. Then he discussed conservation tillage for soybean-wheat system and explained about the enhanced water use efficiency under limited water supply. He also discussed soil fertility constraints for various cropping systems. He mentioned the impact of FYM and fertilizer P and residual P management of Vertisols on production sustainability under soybean-wheat system. He also presented results on the use of balanced fertilization with broad-bed furrow system (BBF) in soybean fields prone to waterlogging. Finally, he discussed the integrated nutrient management technologies for pulses and cotton.

Strengthening collaboration between JNKVV and Tata-ICRISAT-ICAR projects: Dr DH Ranade described the up-scaling and out-scaling of various technologies for water harvesting and conservation.

Development of water harvesting tank/sunken tanks and its effect on crop productivity was discussed. He mentioned about the impact of improved cropping systems through introduction of new varieties in soybean and chickpea. He also presented the effectiveness of tanks under technical guidance. He explained the value addition to the farm produce and income through the introduction of various improved interventions. Finally, he mentioned that the water storage acts as a catalyst to win the hearts of farmers for their active and effective involvement and to increase crop production and decrease the soil erosion hazards.

Agricultural drainage technologies for enhancing the productivity of temporary waterlogged Vertisols: Drs Ramadhar Singh and KV Ramana Rao from CIAE, Bhopal, discussed about the waterlogged areas in India and the various drainage systems used for reducing waterlogging. They discussed the effect of sub-surface drainage on crop yields. It was mentioned that the drainage technology is ready for transfer to farmers' fields. They also gave the cost-benefit ratio of the drainage system and highlighted that these were economically viable.

Dr SS Bhatnagar, Ex-Regional Manager, National Seed Corporation (NSC), discussed seed production and certification. He emphasized the need for vegetable and fruits seed production. For improving the incomes, village-level food processes units can be considered.

Mr BB Choudary, Indian Oil Corporation Ltd. (IOCL) discussed wasteland development and biofuels. He mentioned that the IOC is involved in increasing the biofuel production.

Dr SP Wani gave the guidelines for the location-wise finalization of the detailed workplans. Finally, he congratulated all the speakers for their good presentations.

These presentations were followed by good discussions. The key discussions were on the issue of sub-surface drainage vs. surface drainage system, the role of water harvesting in reducing risk and village-based seed system.

Technical Session IV

Work Plan Development 2009-10: SDTT-ICRISAT-ICAR Project

Improving Rural Livelihoods and Minimizing Land Degradation through the Community Watershed Approach for Sustainable Development of Dryland Areas

Specific Objectives

- To consolidate the science-led farmer-centric community watershed approach at nucleus benchmark watersheds for enhancing productivity and reducing land degradation in three districts and to use these sites as centers of learning for scaling-out the benefits across the three districts.
- To scale-out the benefits of productivity enhancement and community watershed management with technical backstopping in the target agro-eco-region of Madhya Pradesh and Rajasthan.
- Capacity-building of lead farmers, development workers, and consortium partners in the target region, and provide technical support to the development agency in the area of community watersheds.

Target Region

- Madhya Pradesh - Eight districts (Rajgarh, Sehore, Raisen, Vidisha, Indore, Shajapur, Barwani, and Guna)
- Rajasthan – Eight districts (Alwar, Banswada, Bhilwara, Jhalwar, Sawai Mathopur, Tonk, Dongarpur and Bundi)

Consortium partners for Madhya Pradesh sites

Implementing partners	Other partners
• BAIF • BYPASS • CARD	• Dept of Rural Development, Government of Madhya Pradesh • Dept of Agriculture, Government of Madhya Pradesh • College of Agriculture, Indore • Indian Institute of Soil Science (IISS) • Central Institute of Agricultural Engineering (CIAE) • *Zilla Panchayat* • KVKs

Consortium partners for Rajasthan sites

Implementing partners	Other partners
• BAIF • DEEP	• Dept of Watershed Management • Dept of Agriculture and Extension • Rajasthan Agricultural University and Maharana Pratap University of Agriculture and Technology • Central Arid Zone Research Institute and Central Research Institute for Dryland Agriculture • *Zilla Parishad* • Krishi Vignana Kendra, National Bank for Agriculture and Rural Development

SDTT-ICRISAT-ICAR Project Workplan 2009-10

Main activities and sub activities proposed to undertake during 2009-10.

Activities	Main partner name				
	Rajasthan		Madhya Pradesh		
	BAIF (15 vill.)	DEEP (3 vill.)	CARD (5 vill.)	BYPASS (10 vill.)	BAIF (26 vill.)
Soil fertility enhancement					
Vermicompost	110(5)	10	25	46	27 vermi 25 NADEP
Tank silt application	5 tank	-	-	-	-
Gliricidia	500 RMT in each	-	500 RMT	500 RMT in each district	1500 RMT in each district
Increasing water use efficiency					
BBF system	-	20 ha	5 ha	5 ha	300 ha
Contour cultivation with conservation furrow	20 ha	25 ha	5 ha	100 ha	-
Low cost drip irrigation	-	-	2 units	4 units	5 units
Field bunding & deep tillage	25 ha	-	-	-	-
Crop intensification					
Rainy season fallow	-	-	25 ha	-	80 ha
High value crops (Vegetable cultivation)	15 ha in each district	-	5 ha	-	30 ha

Cont...

Cont...

Activities	Main partner name				
	Rajasthan		Madhya Pradesh		
	BAIF (15 vill.)	DEEP (3 vill.)	CARD (5 vill.)	BYPASS (10 vill.)	BAIF (26 vill.)
Crop intensification	5 ha	-	10 ha	5 ha	35 ha
Inter crops	5 ha	5 ha	-	-	15 ha
Increasing crop yield					
Improved cultivars & seed treatment viz. Rhizobium + PSB	100 ha	50 ha	80 ha	100 ha	200 ha
INM	100 ha	100 ha	25 ha	70 ha	200 ha
Seed bank	5 nos	2 nos	-	4 nos	12 nos
IPM	-	10 ha	10 ha	5 ha	30 ha
Income-generating activities					
Goatry/breed improvement	15 groups	10 groups	1 group	1group (poultry)	7 groups
Seed & fertilizer procurement & selling	5 SHGs	2 SHGs	-	1 SHGs	-
Nursery	-	-	0.5 ha	0.5 ha	2.0 ha
Livestock development					
AI	600 animals	-	-	-	1000 animals
Infertility/health camp	5 camps	2 camps	5 camps	4 camps	12 camps
Deworming	500 animals	100 animals	-	-	300 animals
Fodder production	30 ha	30 ha	10 ha	5 ha	20 ha
Capacity building					
Trainings	8	4	5	8	12
Farmers days/ field days	10	4	2	4	10
Exposure visits	1	1	-	1	1
Others					
Afforestation	-	-	50 ha	-	-
Urea treatments fodder	2 demo	1 demo	-	1 demo	10 demos

Workplan Development 2009-10: SRTT-ICRISAT-ICAR Project

Increasing agricultural productivity of farming systems in parts of central India through participatory research-cum-demonstrations and knowledge-sharing innovations

Specific Objectives

- To establish a holistic participatory IGNRM model for the convergence of activities in four nucleus clusters (five villages in each cluster) encompassing suitable technical, institutional, gender equity, and policy options for enhanced agricultural productivity and crop-livestock management systems to alleviate poverty
- To provide technical know-how to farmers, landless rural people in the target districts, and partner NGOs supported by the SRTT in the region through empowerment by bringing together learnings from national and international experience

Target Districts

- Sariekela-Kharsawan and Gumla in Jharkhand
  1000-1600 mm y^{-1} rainfall
- Jhabua and Mandla in Madhya Pradesh
  600-1450 mm y^{-1} rainfall
- Soils Vertisols, Vertic Inceptisols (Black and Entisols)

Implementing Partners

Jharkhand

- Sariekela- Kharsawan district - TSRDS
- Gumla district - PRADAN

Madhya Pradesh

- Jhabua district - GVT
- Mandla district - FES

Kharif Plan and Some Key Points 2009-10

Rice-based System

- Saraikela district - transplanting in 10 ha
- Gumla district - transplanting in 15 ha
- Raising common nursery
- Identify farmers with irrigation facility for nursery raising
- Use vermicompost + micronutrient in nursery raising
- Nursery should be sown by the 1st June
- Identify the demonstrations for the double cropping (farmers with land on down stream)
- Early transplanting
- Soil-test based nutrient management
- Nitrogen – Total 80 kg, basal 30 kg, at tillering 25 kg, at flowering 25 kg
- Basal N (30 kg) + P+K+Zn +B+S (mix together)

Other Crops –Mid and Up Lands

- Jhabua – Maize-based system (maize and soybean)
- Mandala – Maize and pigeonpea
- Gumla – Pigeonpea, finger millet and tomato
- Saraikela – Vegetables, groundnut, chickpea and greengram

Tropicultor: Five trials in each district

Varietals Trials (five trials for each crop, 50% cost recovery)

Crops

Jhabua –	Soybean JS 9305, JS 9560 maize - hybrid, Chandan safed, JM 421 groundnut Pigeonpea – early mature, perennial
Mandala –	Pigeonpea – medium duration maize hybrid groundnut
Saraikela –	Groundnut, pigeonpea, blackgram
Gumla –	Groundnut, maize, finger millet

All these trials will be either on BBF or R&F with micronutrients.

Village Seed Bank: One seed bank with one crop will be established in each district

Gliricidia: 4000 running meters at each location

Soil and Water Conservation: Mainly in-situ moisture conservation

Vermicomposting: Surface model and four chambers commercial model to be established

Field Days: One field day at each location during rainy season

Yield and Other Data: Submission by first week of December 2009

Training and Exposure Visit

- 10 farmers from each location to ICRISAT exposure visit around September 2009
- Training and exposure visit in the local area institution

Rabi Crops

- Wheat and chickpea
- Maize (seed production)
- Mustard
- Greenpeas
- Potatoes

Jhabua: – Chickpea JG 410 and KAK 2 (5 trials each)

– Maize seed production - JM 421 (5 trials)

– Chickpea seed priming - 5 trials

– With all best-bet practices

Mandla: – Chickpea ICCV 37, JG 11 and KAK 2 (30 trials)

– With all best-bet practices

Saraikela: – Chickpea KAK 2, ICCV 2 (100 trials)

– With all best-bet practices and seed priming

Gumla: – Chickpea KAK 2, ICCV 2 (20 trials)

– With all best-bet practices and seed priming

Field Day: One field day in a cropping season

Seed Bank: One seed bank in each district

Yield and Other Data: Yield data to be submitted by 15 April, 2010

Summer Season

Low pressure drip irrigation
Vegetable cultivation

– Common nursery
– Best-bet practices

Some Other Key Points

- Baseline survey data should be completed and submitted to ICRISAT on or before 31st May, 2009
- For state – Jharkhand rice-based system should be taken up
- Districts Gumla and Saraikela of Jharkhand and Mandla of Madhya Pradesh
- Fortnightly communication by e-mail to ICRISAT
- Detailed action plan for the year will be prepared by each partner and submitted by 7 June, 2009

Concluding Session

Chair: *Mr Kiran Petare*
Rapporteur : *Dr KL Sahrawat*

This session was chaired by Mr Kiran Petare and Dr KL Sahrawat was the rapporteur. In this session, the workplans of SDTT-ICRISAT-ICAR and SRTT-ICRISAT-ICAR projects were presented and discussed. Several suggestions were given to improve the workplans for both the projects. It was decided that individual organization should take this tentative workplan and modify it considering the comments and suggestions made. The final workplan for individual organization should be sent to ICRISAT at the earliest possible. Dr Wani gave the vote of thanks.

Tata-ICRISAT-ICAR Projects' Review and Planning Meeting

Productivity Enhancement Initiatives in India

12–13 May 2009
Indian Institute of Soil Science (IISS)
Bhopal, Madhya Pradesh, India

Program

Tuesday, 12 May 2009

0930–1000 Registration

Session 1 Inaugural Session

Chair: *A Subba Rao*
Rapporteur: *Piara Singh*

1000–1010	Welcome and objectives of the workshop	KL Sahrawat
1010–1025	SDTT's role in improving livelihoods through sustainable management of natural resources	Bhaskar Mitra
1025–1040	CInI initiative for sustainable management of natural resources and improved livelihoods	Kiran Petare
1040–1105	Increasing agricultural productivity of farming systems through PR&D and knowledge sharing	SP Wani
1105–1120	Chair's remarks	A Subba Rao
1120–1150	*Photograph and tea/coffee break*	

Session 2 Technical Session I

Chair: *RA Sharma*
Rapporteur: *DH Ranade*

1150–1220	BAIF progress report on productivity enhancement in selected districts of Madhya Pradesh	Somnath Roy
1220–1240	BYPASS progress report on productivity enhancement in Madhya Pradesh	Akhilesh Singh Yadav
1240–1300	CARD progress report on productivity enhancement in Madhya Pradesh	Vivek Sharma
1300–1330	Discussions	
1330–1430	*Lunch*	

Session 3 Technical Session II

Chair: *PK Mishra*
Rapporteur: *P Pathak*

1430–1450	GVT progress report on productivity enhancement in Jhabua, Madhya Pradesh	BS Raghuwanshi
1450–1510	FES progress report on productivity enhancement in Mandla, Madhya Pradesh	Sanjay Kumar Choudhary
1510–1530	DEEP progress report on productivity enhancement in two districts of Rajasthan	BS Choudhary
1530–1550	*Tea/coffee break*	
1550–1610	PRADAN progress report on productivity enhancement in Gumla, Jharkhand	Pankaj Das
1610–1630	TSRDS progress report on productivity enhancement in Saraikela, Jharkhand	Abhishek Kashyap
1630–1650	BAIF progress report on productivity enhancement in districts of Rajasthan	AK Chourasia
1650–1750	Discussions	
1900	*Workshop dinner*	

Wednesday, 13 May 2009

Session 4 Technical Session III

Chair: *Bhaskar Mitra*
Rapporteur: *G Pardhasaradhi*

0900–0920	Strengthening collaboration between CRIDA and Tata-ICRISAT-ICAR projects	PK Mishra
0920–0940	Strengthening collaboration between IISS and Tata-ICRISAT-ICAR projects	A Subba Rao
0940–1000	Strengthening collaboration between JNKVV and Tata-ICRISAT-ICAR projects	RA Sharma/ DH Ranade
1000–1020	*Tea/coffee break*	
1020–1300	Review of day one and working groups for preparing workplans	
1300–1400	*Lunch*	

Session 5 Technical Session IV

1400–1545	Finalization of the detailed workplans – location-wise
1545–1600	*Tea/coffee break*

Session 6 Concluding Session

Co-Chairs: *Kiran Petare and Bhaskar Mitra*
Rapporteur: *KL Sahrawat*

1600–1615	Presentations of the group plans – SDTT-ICRISAT-ICAR project
1615–1630	Presentations of the group plans – SRTT-ICRISAT-ICAR project

List of Participants

Abhishek Kashyap
Tata Steel Limited Rural Services
Jamshedpur 831 001
Jharkhand
Phone : 09470391376
Email : abishisek.kashyap@tatasteel.com

Akhilesh Singh Yadav
Secretary, BYPASS Sansthan
83, Paraspar Colony
Chuna Bhatti, Bhopal 462 016
Madhya Pradesh
Phone : 0755-4281638(O)
9425393744 (R)
Fax :
Email : bypassindia@yahoo.com

Amal Kar
Head of Division
Division of Natural Resources and Environment
Central Arid Zone Research Institute (CAZRI)
Jodhpur 342 003
Rajasthan
Phone : 0291-2786534(R),
02912785659(O)
Fax : 0291-2788706
Email : amalkar@cazri.res.in

Dr.Ambedkar Jayant Dattatraya
Jt. Programme Director
BAIF, "Surubhi"
E- 7/65, Lala Lajpat Rai Society
Arera Colony, Bhopal 462 016
Madhya Pradesh
Phone : 0755-2428619
Fax : 0755-2428619
Email : baif_mp@yahoo.com
dr_jdambedkar@yahoo.co.in

Arvind Singh
Area Programme Officer, BAIF
Q.No. 61, BSI Colony
Station Road, Sehore
Madhya Pradesh
Phone : 07562-221196(O)
Fax :
Email :

Bachchu Singh Choudhary
Secretary
Deep Development Research
Foundation Institute
Jatwalai village, Tahsil, Weir
Bharatpur district, Rajasthan
Phone : 05643-211706(R) , 9785793352
Fax :
Email : deep_inst@rediffmail.com

Bhide Avinash Ramkrishna
Jt. Programme Director
BAIF Regional office
IOA Umesh Nagar, Annapurna Road
Indore
Madhya Pradesh
Phone : 0755-2428619
Fax : 0755-2428619
Email : baifind@yahoo.co.in

Choudary B B
GM (Biofuels), IOCL
905, Indian Oil Bhawan
Yusuf Saran
New Delhi 110 026

Phone : 011-26859056
Fax : 011-26859270
Email : bhartchoudhary@iocl.co.in

Chourasia A Kumar
Chief Program Coordinator
BAIF Bhawan, 18, G Block
Opp. community, Sector No. 14
Hiran Magri
Udaipur 313 002
Rajasthan

Phone : 0294-2640133 (O)
0294-2641559 (R)
Fax : 0294-2640133
Email : sridma@gmailmail.com

Dhirubhai D Pandit
PC, BAIF Divisional Office
Bundi
Rajasthan

Phone : 0747 2447883/ 09460244168
Fax :
Email : baifbundi-97@rediffmail

Desarkar Pinaki
Programme Officer
BAIF Regional Office
10-A, Umesh Nagar
Annapurna Road
Indore 452 009
Madhya Pradesh

Phone : 0731 4202846/ 09406063457
Fax :
Email : pinarray1@yahoo.com

Dixit Santosh Kumar
Area Programme Officer
Pandey Colony, Near new bus stand
Vidish, Madhya Pradesh

Phone : 9926379347
Fax :
Email :

Gupta Dinesh Prasad
BAIF Development Research Foundation
E- 7/65, Lala Lajpat Rai Society
Arera Colony
Bhopal 462016
Madhya Pradesh

Phone : 09407256525
Fax :
Email :

Hakim Singh Rajput
Area Programme Coordinator
BAIF Development Research Foundation
E- 7/65, Lala Lajpat Rai Society
Arera Colony
Bhopal 462016
Madhya Pradesh

Phone : 9425037053
Fax :
Email : baifguna@rediffmail.com

Jayanta Kumar Saha
Principal Scientist
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 004
Madhya Pradesh
Phone : 0755-2730970/ 09893512252
Fax : 0755-2733310
Email : jk_saha12000@yahoo.com

Jay Prakash Sharma
District Programme Coordinator
BAIF District Office
Dr Hedgewar Colony
Rajgarh, Madhya Pradesh
Phone : 09977381007
Fax :
Email : jpsharma1972@rediffmail.com

Kiran Jayprakash Petare
Programme coordinator (CINI)
23, Yogashram Society
Opp. Kenyug Apartments
Shyamal Road, Ambawadi
Ahmedabad 380 015
Gujarat
Phone : 079-26604965 (O)
Fax :
Email : kpetare@tata.com

Kundu Samaresh
Head, division of Environmental Soil Science
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 09424476497
Fax :
Email : samareshk_2006@yahoo.com

Kushwah P rabhat Kumar
P.O. BAIF/SPESD
Anandpur, Dist. Vidisha
Madhya Pradesh
Phone : 9424406723
Fax :
Email :

Lalit Kumar Gangwar
Program Officer
Gramin Vikas Trust
Jhabua
Madhya Pradesh
Phone : 07392 242209/ 09770358546
Fax : 07392 242289
Email : gangwarabm@yahoo.co.in

Manna Madhab Chandra
Principal Scientist
Head Soil Biology
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2730970(O)
Fax : 0755-2733310
Email : mcm@iiss.ernet.in

Mishra AK
Head, Principal Scientist
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2730970 (O)
0755-2416847 (R)
Fax :
Email : Akm@iiss.ernet.in

Mishra Prasanta Kumar
Project Co-ordinator, (Dryland Research)
Central Research Institute for Dryland Agriculture (CRIDA)
Santhoshnagar
Hyderabad 500 059
Andhra Pradesh
Phone : 040 -24530161(O)
040-24061231(R)
Fax : 040- 24531802
Email : pkmbellary@rediffmail.com

Murali Dharudu Yadiki
PC (STCR)
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2733314(O)
0755-2743264(R)
Fax : 0755-2733310
Email : pcstcr@gmail.com

Ramana Rao KV
Senior Scientist
Irrigation & Drainage Engineering Division
Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone :
Fax :
Email : kvramanarao@yahoo.com

Singh Ramadhar
Senior Scientist
Irrigation and Drainage Engg. Division
Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2521157(O)
0755-2628213(R)
Fax : 0755-2734016
Email : rsingh@ciae.res.in

Ranade Deepak H
Senior Scientist (Soil & Water Management)
College of Agriculture
Indore
Madhya Pradesh
Phone : 0731-27012591 (O)
0731-2702033(R)
Fax : 0731-2710510, 0731-2496989
Email : dhranade@rediffmail.com

Rao DLN
Project Coordinator
All India Network Project on Soil Biodiversity-Biofertilizers
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2736846(O),
0755-2625547(R)
Fax : 0755-2733310
Email : dln_rao@rediffmail.com

Rakesh Kumar Singh
Scientist (SS)
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755 2730970
Fax : 0755 2733310
Email : RKS@iiss.ernet.in

Sammi Reddy Kotha
Senior Scientist
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2730946(O), 0755-2684559(R)
Fax : 0755-2733310
Email : ksr@iiss.ernet.in

Sandeep Khanwalkar
State Coordinator – Crops & Livestock
MPRLP
3rd Floor, Beej Bhavan, Arera Hills
Bhopal, Madhya Pradesh
Phone : 0755-2766813-15
Fax : 0755-2766818
Email : sandeep@mprlp.in

Sanjay Kumar Choudhary
Team Leader
Behind Lakshya Motors
Mridu Kishore Colony
Mandla, Madhya Pradesh
Phone : 09425163767
Fax :
Email :mandla.fes@ecologicalsecurity.org

Sharma JP
BAIF Development Research Foundation
E- 7/65, Lala Lajpat Rai Society
Arera Colony
Bhopal 462 016
Madhya Pradesh
Phone : 0755-2428619
Fax : 0755-2428619
Email : baif_mp@yahoo.com

Singh Kamalesh Narain
Indian Institute of Soil Science
Nabi Bagh
Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2730770(O), 9425300762
Fax : 0755-2733310
Email : drknsingh2003@yahoo.co.in

Singh Dadan
Agriculturist
Tata Steel Rural Development Society
E-Road, Bistupur
JSR, Tata Nagar
Jharkhand
Phone : 21442810
Fax :
Email :

Muneshwar Singh
Project coordinator-LTFE
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 0755-2733371
Fax : 0755-2733310
Email : muneshwarsingh@gmail.com

J Somasundaram
Senior Scientist
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038, Madhya Pradesh
Phone : 0755-2730946(O)
09981840444
Fax : 0755-2733310
Email : somasundaram@iiss.ernet.in
somajayaraman@yahoo.co.in

Somnath Roy
Chief Programme Coordinator
BAIF Development Research Foundation
E- 7/65, Lala Lajpat Rai Society
Arera Colony
Bhopal 462 016, Madhya Pradesh
Phone : 0755-2428619
Fax : 0755-2428619
Email : baif_mp@yahoo.com

Surendra Swaroop Bhatnagar
Advisor, MP Seed Federation
A-174, Shahpura Sector-A
Bhopal 462 016
Madhya Pradesh
Phone : 0755 2462340/
09425602483
Fax :
Email :

Syed Lutfur Rahman
Executive
PRADAN
Gumla
Nersaria Complex, 2nd Floor
Jharkhand
Phone : 06524 223807/
09798361763
Fax :
Email : syedlutfurrahman@pradan.net

Tiwari Devendra Pati
Programme Officer
BAIF Developmen Research
BAIF Bhawan, 18G Block
Udaipur 313 002
Rajasthan
Phone : 0294-2640133(O),
09413101110
Fax : 0294-2640133
Email : baifbundi97@rediffmail.com
rridma@gmail.com
rridma@senchunet.com

Tripathi Awadhesh Kumar
Senior Scientist
Indian Institute of Soil Science
Nabi Bagh, Berasia Road
Bhopal 462 038
Madhya Pradesh
Phone : 07552730946(O),
07552628509(R)
Fax : 0755-2733310
Email : akt@iiss.ernet.in

Sharma Vivek V
Chief Functionary
Centre for Advanced Research & Development (CARD)
E-7/803, Arera Colony
Bhopal 462 016
Madhya Pradesh

Phone : 0755-2426250(O)
0755-2425076(R)
Fax : 0755-2426250
Email : card_vivek@yahoo.com

Yaseen Khan
Associate Fellow
E-7/803, Arera Colony
Bhopal 462 038
Madhya Pradesh

Phone : 09407126826
Fax :
Email : khan_YK@yahoo.com

Umesh Kumar Sharma
Program Coordinator
Gramin Vikas Trust
Jhabua
Madhya Pradesh

Phone : 07392 244289/
09425601872
Fax : 07392 244289
Email : umeshgvt@rediffmail.com

ICRISAT Staff

Mathur Tej Pal
GT on Agroecosystems
Visiting Scientist
5/62, S.F.S. Agarwal Farms
Mansarovar
Jaipur 302 020
Rajasthan

Phone : 911412398085, 2398085(R)
Email : tej_mathur@yahoo.com

Pal CK
Scientific Officer, ICRISAT
GT on Agroecosystems
C/o Mr M.K. Divedi
4/23 Shivaji Nagar
Dungarpur
Rajasthan

Phone : 09413947078
Email : ckpal_1978@rediffmail.com

Pardhasaradhi G
Lead Scientific Officer
GT on Agroecosystems

Phone : Extn. 2378
Email : gsaradhi@cgiar.org

Pathak P
Principal Scientist (Soil and Water Mgmt)
GT on Agroecosystems

Phone : Extn. 2337
Email : p.pathak@cgiar.org

Piara Singh
Principal Scientist (Soil Science)
GT on Agroecosystems
Phone : Extn. 2334
Email : p.singh@cgiar.org

Raghavendra Rao S
Lead Scientific Officer
GT on Agroecosystems
Phone : Extn. 2376
Email : s.r.rao@cgiar.org

Ramakrishna Kishore Reddy G
Scientific Officer
GT on Agroecosystems, ICRISAT
C/o. BAIF Development Research Foundation
'SURBHI', Lala Lajpatrai Society
E-7/65, Arera Colony
Bhopal 462 016, Madhya Pradesh
Phone : Extn. 09753815162
Email : gdirddi@gmail.com

Sahrawat KL
Visiting Scientist
GT on Agroecosystems
Phone : Extn. 2529
Email : k.sahrawat@cgiar.org

Satyanarayana KNV
Administrative Officer
GT on Agroecosystems
Phone : Extn. 2310
Email : k.satyanarayana@cgiar.org

Wani SP
Principal Scientist (Watersheds) &
Regional Theme Coordinator
GT on Agroecosystems
Phone : Extn. 2466
Email : s.wani@cgiar.org

Glimpses of the Workshop

12–13 May 2009
Indian Institute of Soil Science (IISS)
Bhopal, Madhya Pradesh


Sir Ratan
Tata Trust
Sir Dorabji
Tata Trust
Tata-ICRISAT-ICAR Projects'
Review and Planning Meeting

Group Photograph

PowerPoint Presentations

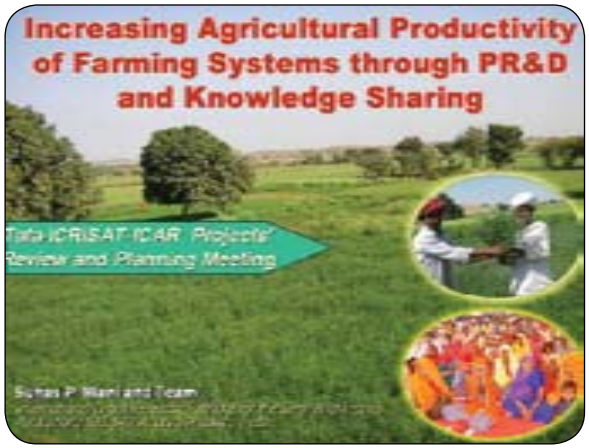
Tata-ICRISAT-ICAR Projects' Review and Planning Meeting

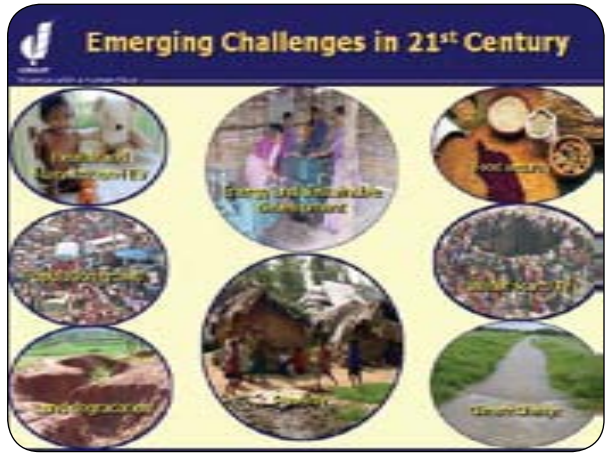
Sustainable Productivity Enhancement Initiatives in India

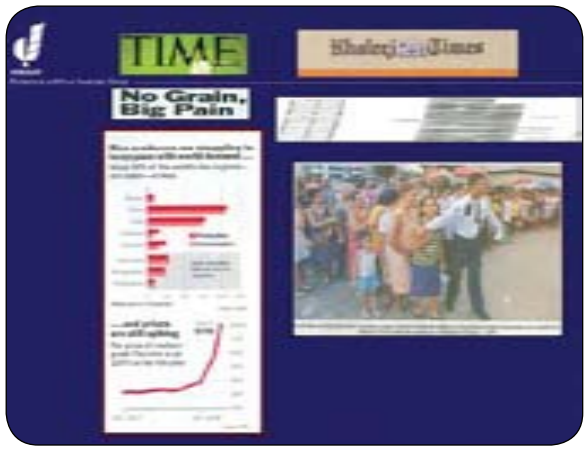
12–13 May 2009
Indian Institute of Soil Science
Bhopal, Madhya Pradesh

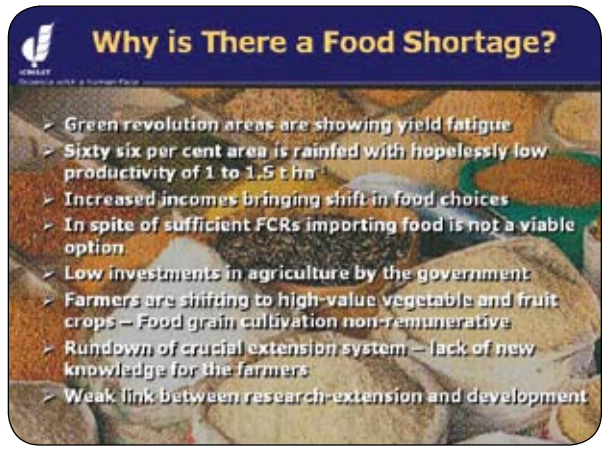
Objectives

- To review the progress and synthesize the findings from the work done at different locations under SRTT and SDTT projects
- To identify emerging issues, discuss up-scaling strategies, and prepare workplans for sustainable use of natural resources and increasing productivity in India


Increasing Agricultural Productivity of Farming Systems through PR&D and Knowledge Sharing
Tata-ICRISAT-ICAR Projects' Review and Planning Meeting


Emerging Challenges in 21st Century


TIME
No Grain, Big Pain

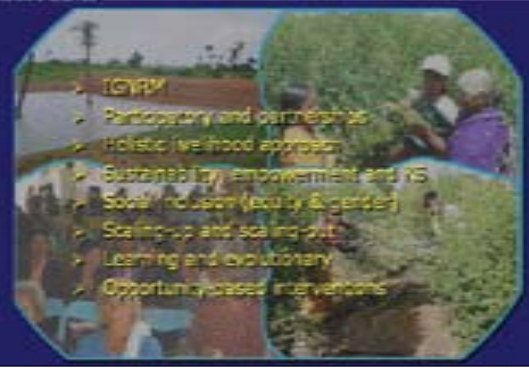

Why is There a Food Shortage?
Green revolution areas are showing yield fatigue
Sixty six per cent area is rainfed with hopelessly low productivity of 1 to 1.5 t ha-1
Increased incomes bringing shift in food choices
In spite of sufficient FCRs importing food is not a viable option
Low investments in agriculture by the government
Farmers are shifting to high-value vegetable and fruit crops – Food grain cultivation non-remunerative
Rundown of crucial extension system – lack of new knowledge for the farmers
Weak link between research-extension and development

Tata-ICRISAT-ICAR Projects: Novel Initiative

- Targeting hot spots of poverty
- Science-based development initiative
- Linking scientists-development agencies, government line departments – farmers – A consortium approach
- Process for minimizing land degradation, increasing productivity and incomes while sustaining natural resources

Strategy

Farmers centered watersheds as entry point for improved livelihoods



- IGWP
- Participatory and partnership
- Holistic livelihood approach
- Sustainability, empowerment and IS
- Social inclusion (equity & gender)
- Scaling-up and scaling-out
- Learning and evolutionary
- Opportunity-based interventions

Target Ecoregions

Where We Are?

Project Planning Workshop

Objectives

- Consortium partners internalized the project objectives, strategy and modalities of work
- Detailed workplans for each site were developed
- Networking of partners
- MOUs were signed

Convergence of Projects and Resources

- Productivity enhancement initiative thru enhanced WUE in MP and Rajasthan – Ministry of Water Resources, GoI

A WUE Project for

- BAIF-MP was also facilitated
- Model watersheds with common guidelines in Rajasthan and MP – MoA Project

Weather Monitoring


Dual purpose manual and recording type rain gauge with rainfall, Min & Max Temp, Relative Humidity high & low recording data logger installation at Sherbida of Jharkand and Hatyadoli of Madhya Pradesh

Farmer Participatory Soil Sampling


Soil sampling training to farmers of [illegible] village of Saraikela Kharsawan district, Jharkand and Hatyadoli village of [illegible] block of [illegible] district of Madhya Pradesh during May 2008

Summary of Soil Nutrient Status in SDTT-ICRISAT-ICAR Project Sites

District	Avail-S (mg kg⁻¹ soil)	Avail-B (mg kg⁻¹ soil)	Avail-Zn (mg kg⁻¹ soil)
Badwani			
Average	11.8	0.4	0.6
% Deficient Farmers	55	89	75
Indore			
Average	29.7	0.8	1.3
% Deficient Farmers	9	17	22
Shajapur			
Average	17.2	0.4	0.8
% Deficient Farmers	25	89	40
Rajgarh			
Average	19.3	0.5	1.1
% Deficient Farmers	53	73	27
Guna			
Average	6.1	0.4	0.5
% Deficient Farmers	85	95	95
Vidisha			
Average	5.7	0.5	0.4
% Deficient Farmers	95	86	100
Raisen			
Average	6.2	0.4	0.5
% Deficient Farmers	90	98	90

Summary of data on avilable Zn, B, S in Soil Samples Collected from Farmers Fields in Bundi and Dungarpur Districts of Rajasthan

Location	No. of farmers	Avail-Zn (mg kg^{-1} soil)		Avail-B (mg kg^{-1} soil)		Avail-S (mg kg^{-1} soil)	
		Min	Max	Min	Max	Min	Max
Bundi	36	0.20	1.8	0.1	0.98	3.2	58.9
(% deficient fields)		67		72		72	
Dungarpur	11	1.1	14.1	0.28	0.90	4.0	17.6
(% deficient fields)		0		81		3	

Summary of soil samples analysis results of chemical properties in SRTT-ICRISAT-ICAR Project Sites

Particulars	pH	EC	% org C	Olsen P	Exch K	Avail S	Avail B	Avail Zn
Sarikela-kharswan District								
Average	5.7	0.1	0.4	0.9	38.0	6.0	0.1	0.5
% Deficient farmers			77	97	73	83	100	87
Gumla								
Average	5.8	0.1	0.6	13.0	84.4	4.2	0.2	0.8
% Deficient farmers			47	23	27	100	100	73
Jhabua								
Average	7.0	0.2	0.9	9.7	216.0	6.3	0.4	1.5
% Deficient farmers			0	45	0	95	91	5
Mandla								
Average	6.6	0.1	0.7	2.8	146	4.8	0.20	0.79
% Deficient farmers			14	90	0	90	100	52

Crop Demonstration in *Kharif* 2008

Tropicultor-Improved Equipment for Field Operations

Tropicultor operation for plowing and bed formation, Katangisihni, Mandla, Madhya Pradesh.

Tropicultor operation with tractor for broad-bed furrow formation for groundnut crop Telya village and sowing Chickpea with bullocks in Sherbilla village Jharkand

Soybean crop yields in water use efficiency trial during *kharif*, 2008, Madhya Pradesh

District	No. of Farmers	Grain Yield (t ha^{-1})		Increase in WUE (%)
		Improved system	Farmers Practice	
Vidisha	20	1.46	1.26	16
Raisen	14	1.97	1.19	66
Guna	19	1.31	1.20	9
Sagar	9	1.61	1.13	42
Mean	62*	1.59	1.20	33

Results of Integrated nutrient management trials conducted at Hatyadeli village of Meghanagar Block of Jabhua district of Madhya Pradesh, during rainy season2008

Crop	No of Farmers	Grain yield kg ha^{-1}		% of Increase
		INM	Control	
Soybean	15	1910	1560	**22.4**
Maize	7	5330	4240	**25.7**
Groundnut	3	2380	2060	**15.5**
Blackgram	2	1160	1000	**16.5**

Grain/Pod yield kg ha^{-1} for different treatment with groundnut and black gram crop rainy season 2008 at Teleya village, Gamla district Jharkand

SI No	Treatment	No of farmers	Crop	Variety	Grain/pod yield kg ha^{-1}	% increase
1	Variety control	10	Groundnut	JGGV9L114	970	–
2	Variety + Micro nutrient	8	Groundnut	JGGV9L114	1140	17
3	Variety + Micro nutrient +RRF	4	Groundnut	JGGV9L114	1450	50
4	Variety control	2	Black gram	T9	750	–
5	Variety + Micro nutrient	2	Black gram	T9	900	27

Review and *Rabi* Planning Meeting in Madhya Pradesh

- Reviewed the progress of *kharif* trials
- Detailed planning for *rabi* trials with all the partners

Micronutrient and Crop Varieties During Rainy Season 2008

Groundnut ICGV 91114 and Black gram T9 crop with micro-nutrient trial during rainy season 2008 at [illegible] village [illegible] district Jharkhand

Chickpea crop yield (t ha⁻¹) in improved system as compared to farmer's practice in three districts of Madhya Pradesh during post-rainy season (rabi), 2007-2008

District	Improved management*		Farmer's practice		Increase (%)	
	Grain	Dry matter	Grain	Dry matter	Grain	Dry matter
Vidisha	1.71	2.40	1.16	1.83	47	31
Raisen	1.33	1.70	0.86	1.50	55	13
Guna	1.76	3.07	1.13	1.77	56	73
Mean	1.60	2.39	1.05	1.70	52	41

*Improved management involves broadbed and furrow land configuration and application of nitrogen, phosphorus, sulfur, boron and zinc and improved variety.

Yields (kg ha⁻¹) of various crops under balanced nutrition as compared to farmer's practice in Bundi, Rajasthan, 2007 *kharif*

Crop	Grain yield		% increase over Farmer's practice
	Farmer's practice*	FP+BSZN@	
Maize	4674	5763	23
Blackgram	1500	1960	31
Soybean	3000	3800	27
Sorghum	2400	2700	13
Pearl Millet	2520	2750	10
Groundnut	2320	2900	25

*Farmers practice comprises of farmers application of nutrients.
@Over farmers practice nitrogen, phosphorus, sulfur, boron and zinc were applied at specified rates at planting.

Mean chickpea yields in water use efficiency trials in Madhya Pradesh during 2008-09 *rabi* season

District	Farmers participated*	Grain yield (t ha⁻¹)@		Increase in WUE (%)
		Improved system	Farmers Practice	
Vidisha	53	1.77	1.47	20
Raisen	20	1.45	1.08	34
Guna	32	1.77	1.39	27
Sagar	21	1.38	1.19	16
Mean	126*	1.62	1.27	28

* Total of two seasons; @ mean of 2007/08 and 2008/09

Crop Demonstration in Rabi 2008-09

Post-rainy Season Trials

Chickpea sown with seed priming at Tolya village of Gumla district and Sherbida villages of Sarikela khansaw district of Jharkand state during 2008-09

Increased Productivity (t ha^{-1}) of crops in Tonk and Sawainadhopur districts of Rajasthan, Rabi Season, 2008

Crop	No. of farmers	Grain	Fodder	Grain	Fodder	Grain	Fodder
Village- Jawad Dist. Sawainadhopur (Raj.)							
Wheat	9	4.8 (20%)	4.8 (20%)	4.4 (10%)	4.3 (10%)	3.6	3.6
Mustard	9	1.3 (20%)	1.3 (20%)	1.4 (10%)	1.3 (8%)	1.2	1.2
Chickpea	7	1.7 (10%)	1.7 (10%)	1.5 (20%)	1.5 (20%)	1.2	1.2
Village- Kawajpura Dist. Sawainadhopur (Raj.)							
Wheat	10	4.7 (20%)	4.7 (20%)	4.2 (10%)	4.2 (10%)	3.6	3.6
Mustard	10	1.3 (20%)	1.3 (20%)	1.4 (15%)	1.3 (8%)	1.2	1.2
Chickpea	7	1.3 (20%)	1.3 (20%)	1.4 (15%)	1.3 (8%)	1.2	1.2
Village- Parwad Dist. Tonk (Raj.)							
Wheat	10	4.3 (20%)	4.3 (20%)	3.8 (10%)	3.8 (10%)	3.4	3.4
Mustard	10	1.7 (20%)	1.7 (20%)	1.4 (7%)	1.3 (13%)	1.2	1.2
Chickpea	7	1.6 (20%)	1.6 (20%)	1.4 (15%)	1.4 (10%)	1.2	1.2
Village- Dhanla Dist. Tonk (Raj.)							
Wheat	9	4.1 (7%)	4.1 (7%)	3.7 (-9%)	4.2 (17%)	3.8	3.9
Chickpea	8	1.8 (20%)	1.8 (20%)	1.6 (6%)	1.7 (13%)	1.5	1.5

Information on area sown under chickpea trials at different locations during post-rainy season 2008-09 under SRTT project

Sl No	Watershed Villages and their Locations	Chickpea Variety	Seed Quantity	Total No. of Farmers Participating
1	Teleya-District Gumla-Jharkand	KAK 2, ICCC 37, ICCV 2, JG 11	300 kg	28 farmers
2	Sherbida village-Sarikela-Khansaw Jharkand	KAK 2, JG 11 ICCV 2	1000 kg	17 farmers
3	Katangsivni-District Mandla-Madhya Pradesh	ICCC 37, JG 11	450 kg	10 farmers
4	Hathyadeli village of Jhabua-district, Madhya Pradesh	JGK-1	500 kg	26 farmers
	Total		2250 kg	81 farmers

Chickpea yield with seed priming technique in rice fallow fields at Sherbida village of Sarikela - Karshaw district of Jharkand during winter 2008

Sl No	Chickpea Variety	No of Farmers	Area covered ha	Grain yield kg ha^{-1}
1	KAK 2- Kabuli	16	3.20	1610
2	JG 11-Desi	15	3.10	1165

Chickpea yield with seed priming technique in rice fallow fields at Teleya village of Gumla district of Jharkand during winter 2008

Sl No	Chickpea Variety	No of Farmers	Area covered ha	Grain yield kg ha^{-1}
1	KAK 2- Kabuli	12	1.2	1600
2	JG 11-Desi	6	0.6	1020
3	ICCC 37-Desi	10	1.0	1050
4	ICCV 2-Kabuli	8	0.4	1250
5	ICCV 10-Desi	4	0.2	905

Chickpea yield planted after soybean crop at Katang sivini village of Mandla district of Madhya Pradesh during winter 2008

Sl No	Chickpea Variety	No of Farmers	Area covered ha	Grain yield kg ha^{-1}
1	ICCC 37-Desi	10	3.0	1050
2	JG 11-Desi	8	1.5	1100

Micronutrient Trials with Vegetable Crop

Tomato crop with micronutrient application at Sherbida village of Sarikela District of Jharkand

Vermicomposting

Objectives

1. Proper utilization of Animal dung's the and maintain the nutrients
2. Reduce the dependency of chemical fertilizers and promoted to organic farming
3. Improve the Soil as well as human health

Vermicomposting

Vermicompost unit construction is in progress at Sherbida village of Sarikela district of Jharkand

Capacity Building

Training of Farmers

Soil sampling for nutrient analysis in Madhya Pradesh

Farmers learning about operation for using implement and sowing operation

Glyricidia planted on border, Sherbida village, Jharkand

Chickpea seed priming with Rhizobium culture and sodium molybdate for good crop establishment in rice fallow fields, demo at Sherbida village Jharkand

Rallies on Environment Awareness, Health and Hygiene

Objectives

1. Develop the awareness about our environments and global warming for their effects on human health
2. Develop the awareness about the ladies rights in the globes
3. Develop the awareness about the soil and water conservation & adoption of new agriculture technology

Field Day's in Jharkhand

Field day photographs of Sherbida village of Saraikela-Kharsawa district of Jharkand

Field Day's in Jharkhand

Field day photographs of Teleya village of Gumla district of Jharkand

TATA ICRISAT PROJECT - AT A GLANCE IN MADHYA PRADESH

WORKING AREA IN MADHYA PRADESH

GENERAL INFORMATIONS

- TOTAL AREA (IN ACRE) :- 132
- TOTAL DISTRICTS :- 6
- NO. OF VILLAGES :- 26
- TOTAL PARTICIPANTS :- 132
- MAJOR CROPS :- SOYBEAN, MAIZE, CHICK PEA
- TECHNIQUE :- PARTICIPATORY INTEGRATED NUTRIENT MANAGEMENT
- TOTAL BENEFICIARIES (UPTO 2008 RABI SEASON) :- 2680

PRODUCTIVITY DURING BASE YEAR 2007

CROPS	PRODUCTIVITY (in kg.)						
	STATE	DISTRICTS					
		RAJGARH	GUNA	VIDISHA	SEHORE	INDORE	BARWANI
SOYBEAN	1036	1057	1269	1099	1308	1463	454
MAIZE	1295	1138	1064	1345	1200	1161	1061
CHICKPEA	712	689	326	706	572	767	555

Source : Survey of Agriculture by Krishak Jagat

LEVEL OF NUTRIENTS DURING BASE YEAR 2007-08

S. No.	Nutrients	Critical Limits	Location-wise Findings					
			Average			Percentage of Deficient Farmers		
			Rajgarh	Anandpur	Barwani	Rajgarh	Anandpur	Barwani
1	P (ppm)	5.0	6.00	4.30	5.00	60	70	70
2	S (ppm)	10.0	12.30	5.50	11.80	53	90	55
3	B (ppm)	0.50	0.60	0.50	0.40	73	90	80
4	Zn (ppm)	0.75	1.10	0.40	0.60	27	90	75
5	Org. C (%)	0.50	0.70	0.52	0.51	13	45	45
6	K (ppm)	50	200.00	230.00	140.00	0	0	0

FIELD LEVEL ACTIVITIES

S. No.	Activity	Unit	Nos.	Beneficiaries /Participants
1	Soil Sampling	Sample	109	109
2	Household Survey	Family	251	251
3	INM Plots	Acre	132	132
4	Farmers Meeting	Nos.	102	9680
5	Farmers Day	Nos.	7	520
6	Farmers Training (One Day Programme)	Nos.	4	200
7	Exposure Visit	Nos.	1	30

TREATMENT OF INM

Control Plot	Treatment Plot		
Farmers Practices	DAP	-	54 kg.
	Urea	-	30 kg.
	Zn Sulphate	-	10 kg.
	Zypsum	-	40 kg.
	Agribor	-	0.5 kg.
Plot Size	-	2000 sq.mtr.	

GROWTH OBSERVATION IN CASE OF SOYBEAN YEAR 2008-09

INDICATORS	TREATMENT PLOT	CONTROL PLOT	VARIANCE
PLANT POPULATION	41.95	37.64	11.47%
NO. OF NODULES PER PLANT	27.52	20.08	37.06%
PLANT HIEGHT	56.28	48.76	15.42%
BRANCHING	17.64	15.72	12.21%
PEST & DISEASES	28%	39%	28.2%
GRAIN YIELD PER PLOT (IN QT)	3.57	2.46	45.12%

YIELD ANALYSIS UNDER INM

S. NO.	INDICATOR	CROP			
		KHARIF 2008-09		RABI 2008-09	
		SOYBEAN		CHICKPEA (L)	
		T	C	T	C
01	RANGE OF GRAIN YIELD (in qtl./plot)	2.2 - 6.6	1.52 - 3.60	0.80 - 1.50	0.70 - 1.30
02	AVG. GRAIN YIELD PER PLOT (in qtl.)	3.57	2.46	3.56	2.23
03	ADDITIONAL INPUT COST (Rs.)	840	-	840	-
04	ADDITIONAL YIELD (in qtl.)	1.12	-	1.12	-
05	VALUE OF YIELD (Rs.)	1918.43	-	2240	-
06	BENIFITS THROUGH INM INTERMS OF Rs.	978.43	-	1392	-

VARIETAL PERFORMANCE

S.No.	Crop	Variety	Yield (Qtl./ha.)	Farmers Perceptions
1	Soybean	JS 335	17.23	Yield is same but 9305 is the early variety & matured before 15 days
		JS 9305	17.56	
2	Maize	Local	18.00	Participants used hybrid variety in first time
		Hybrid	20.00	
3	Chickpea	ICCC 37	11.43	In case of ICCC 37 insect infestation is high comparative to JG 11
		JG 11	10.00	
		Local	10.00	

YIELD ANALYSIS IN CASE OF MAIZE YEAR- 2008

S. NO.	INDICATOR	T	C
1	PLANT HEIGHT (ft.)	8.00	7.00
2	GIRTH (cms)	15.10	13.3
3	NOS OF COBS	1.79	1.12
4	LENGTH OF COBS (cms)	24.76	23.12
5	ROW OF GRAIN	11.85	8.64
6	WEIGHT PER COBS (gms)	123.80	107.00
7	PLOT YIELD (qt)	4.00	2.00

ACTION PLAN 2009-2010

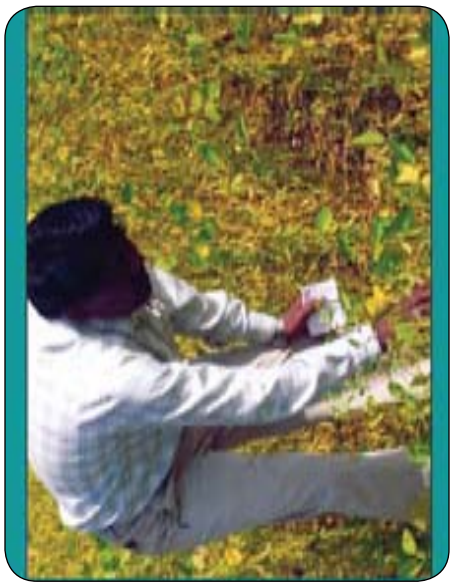
S. NO.	ACTIVITY	PHYSICAL UNIT	NOS.	QUARTER
1	INM	Hectare	179	2nd, 3rd, 4th
2	KITCHEN GARDEN	Nos.	30	2nd, 3rd, 4th
3	VERMICOMPOST	Nos.	27	2nd, 4th
4	CROP DIVERSIFICATION	Hectare	3	2nd, 3rd, 4th
5	FORAGE PRODUCTION	Hectare	5	2nd, 4th
6	SEED BANK	Nos.	12	2nd, 4th
7	FARMERS TRAINING	Nos.	12	2nd, 4th
8	EXPOSURE VISIT	Nos.	1	1st
9	S.H.G. CORPUS	Nos.	18	In a year

ADOPTION OF TECHNOLOGY

S.No.	Techniques	Percentage of Adoption	Constraints
1	IMM	20%	Expensive Inputs & Poor Availability
2	Seed Replacement	30%	Lack of Certified Seeds
3	Soil Sampling	20%	Lack of Training & Facilities of Testing
4	Varietals Change	40%	Lack of Exposure & Awareness

ACTION FOR PROMOTION

- Farmers Day
- Focus Group Discussion
- Field Walk
- Regular Meetings & Visits
- Exposure Visits (TATA ICRISAT Campus)

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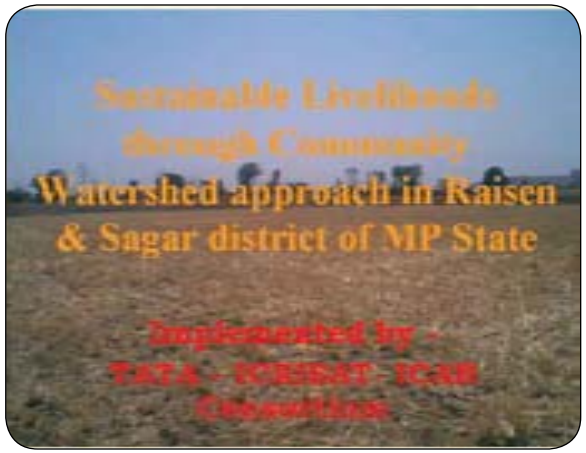


VILLAGES SELECTED FOR PRODUCTIVITY ENHANCEMENT

District SAGAR

VILLAGE	BLOCK
Chitoura	Sagar
Bannad (Barnawad)	Sagar
Shobhapur	Jaisinagar
Chandoni	Jaisinagar
Bichhuwa	Jaisinagar

Social Profile

HH in project area	Population	ST	SC
1180	6477	338	1675
		5.2%	25.9%

Area profile

Total Area	Agriculture Land	Waste Land	Forest Land
3169 ha.	1740 ha.	878 ha.	360 ha.
	54.9%	27.7%	11.3%

VILLAGES SELECTED FOR PRODUCTIVITY ENHANCEMENT

District RAISEN

VILLAGE	BLOCK
Sehora jagir	Begumgunj
Khamariya	Begumgunj
Saajkheda	Begumgunj
Pahariya	Silwani
Bhainsra	Silwani

Social Profile

HH in project area	Population	ST	SC
477	2777	273	404
		9.8%	14.4%

Area profile

Total Area	Agriculture Land	Waste Land	Forest Land
1771 ha.	1385 ha.	196 ha.	104 ha.
	78.2%	11%	3.7%

Intervention in Kharif 2008

- No. of Trials 12
- Crop Soyabean
- Variety JS 9305
- Coverage 24 Acre
- No of beneficiaries 12 Farmers
- Micro Nutrient Supplement (Boron, Zinc, Zypsum)
- Intercroping (Soyabean + Piegenpea)

Farmers observation…….

- 3 Trials failed due to heavy Rains just after sowing
- Growth of plant good
- Pigeon Pea _ Asha variety_ Good Production
- Technical problem with BBF maker

Yield data Kharif 2008

Variety in Treated plot	Yield in Treated Plot	Yield in Control Plot (Local Variety)
JS 9305	20.63 to 18.27	20.95 to 14.38
JS 9305	14.97 (Avg.)	11.77 (Avg.)
Yield in Quintals per Hectare.		

Intervention in Rabi 2008-09

District Sagar

- Trials -31 No
- Villages -3 Beneficiaries -31
- Crop - Chickpea
- Variety- JAKI 9218, JKG 1, ICCCV 37
- Micronutrients- Zinc, Boron, Zypsum

Intervention in Rabi 2008-09

District Raisen

- Trials - 32
- Villages- 5 Beneficiaries -32
- Crop - Chickpea
- Variety - JAKI 9218, JG 16
- Micronutrients - Boron, Zinc, Zypsum

Farmers observations…..

- Better growth of Plant
- Better greenery in plant
- Seed was of good quality
- Rains in Winter (Insect problem)
- "Sookha" disease affected production
- Rate for JKG1 was good

Yield data Rabi Sagar (Jasi Nagar)

Variety in Treated plot	Yield in Treated Plot	Yield in Control Plot with local variety
JAKI 9218	13.59 to 15.86	09.98 to 13.08
JAKI 9218	14.93 (Avg.)	11.43 (Avg.)
Yield in Quintals per Hectare.		

Yield data Rabi Sagar (Sagar Block)

Variety in Treated plot	Yield in Treated Plot	Yield in Control Plot with local variety
ICCCV 37	14.47 to 18.00	11.33 to 14.93
ICCCV 37	15.95 (Avg.)	13.62 (Avg.)
JKG 1	13.00 to 16.86	10.67 to 16.35
JKG 1	15.12 (Avg.)	12.77 (Avg.)
Yield in Quintals per Hectare.		

Yield Data Rabi Raisen

Variety in Treated plot	Yield in Treated Plot	Yield in Control Plot with local variety
JAKI 9218	19.59 to 13.06	15.99 to 12.71
JAKI 9218	17.03 (Avg.)	14.54 (Avg.)
JG 16	15.76 to 12.13	15.03 to 09.54
JG 16	13.49 (Avg.)	12.38 (Avg.)
Yield in Quintals per Hectare.		

Field days

- Village Shobhapur - District Sagar
  Date 8th Jan 2009
  Participants 190
  Issues – Suitable Crop variety for the area & Water Conservation

- Village Pahariya - District Raisen
  Date 31st Jan 2009
  Participants 145
  Issues – Application of Micro Nutrients, Demonstration of Low cost Irrigation system

Plan for Kharif 2009

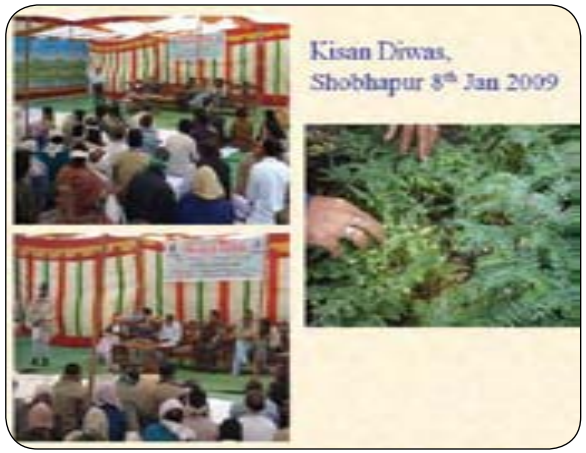
- Sagar District
  No of Farmers 58
  Area 100.5 acre (40.2 Ha)
- Raisen District
  No of Farmers 86
  Area 167.5 acre (67Ha)

Plan for Summer/Rainy season 2009

- Promotion of Kitchen Garden/ Vegetable Cultivation (Sagar 12 farmers + Raisen 11 Farmers)
- Farmers in Chandoni village are ready to grow year round vegetable crops
- Promotion of Organic farming (Sagar 13 farmers + Raisen 13 Farmers)
- Horticulture Activities (Networking with NHM)
- Procurement of Gliricidia cuttings from Anandpur and grow in area

Equipments Needed…..

- Bullock driven tropicultors
- BBF maker
- Macro nutrient test
- Water efficient irrigation techniques
- Weighing machines


Kisan Diwas,
Shobhapur 8th Jan 2009


"Khet Avlokan"
in Shobhapur
Crop - Chickpea


Kisan Diwas
In Pahariya Village
31st Jan 2009


Field Visit in
Pahariya Village
Chickpea plant


Foot pump,
Low cost Drip
Irrigation system
& BBF Maker
Demonstration


THANKS

Center for Advanced Research And Development (CARD), Bhopal

Title of Project:

Improving Rural Livelihoods and Minimizing Land Degradation through the Community Watershed Approach for Sustainable Development of Dry Land Area

CARD : The Organization

CARD is a non-government agency established, in India, in Bhopal under the MP Societies Registration Act, 1973

VISION: *We strive for a prosperous dawn with the promise of empowered communities and self-sustained habitats.*

MISSION: Development with Commitment & Professionalism

CORE VALUES: Participation, Empowerment, Institution Building, Transparency, Team Spirit

CARD Initiatives in Field

CARD: Studies & Evaluations

CARD Presence in Field

District	Region	Professional Strength	Coverage
Bhopal	Vindhya Plateau	20	Madhya Pradesh & CG
Mandla	Eastern Region	15 + 70	205 villages (Mandla)
Dindori	Eastern Region	07 + 20	130 villages in Shahpura
Shajapur	Malwa Region	03 + 8	33 villages of Agar
Ujjain	Malwa Region	03 + 15	48 villages, Ujjain
Jhabua	Western Region	25 + 10	1? villages, Thandla
Dhar	Western Region	10 + 50	28 villages in Tirla
Raipur	Chhattisgarh	04	Chhattisgarh Region
Korba	Chhattisgarh	15 + 80	121 villages
Dhamtari	Chhattisgarh	4 + 20	38 villages in Nagari

Hoshangabad, Harda and Kawardha are new areas of intervention

CARD primarily works on Livelihood promotion in Tribal dominated region and with SC and OBC communities in Plateau region

Project at a glance

Duration of Project : Five Years (Sept 2008 to Aug 2013)

Annual Budget of Project

1. Total Budget of Project -
2. Total Annual Budget - 2,43,500/-
3. Total Fund Received - 2,43,500/-

Implementation team structure

Dr. Yaseen Khan	Associate fallow
Mr Gajendra Singh	Project Coordinator
Mr Nirajan Gour	Research Assistant

Project Objectives

1. To reduce intensity of Soil erosion on hilly tracks of the area
2. To conserve the available surface water of the area
3. To increase agricultural production and productivity.
4. To reduce the level surface runoff by land treatment.
5. To improve ground water resources in the region.
6. To conservation available vegetation and plantation of economic viable plants

Geographical Area Coverage Under Project in District Shajapur

Five Villages of three blocks of Shajapur district

SN	Name of Block	Name of Village	Area (Hact)	Total HH
1.	Barod	1. Barda	943	162
	" "	2. Barkheda	675	196
2.	Susner	1. Khanota	1045	199
3.	Agar	1. Malndiya	1305	164
	" "	2. Moyakheda	1182	100
		Total	5150	821

Caste wise Distribution of Households in Project Area

Sl	Caste	Berda	Berkheda	Khanota	Mahudiya	Moyakheda	Total	% to total
1	General	30	44	49	1	0	124	18.10
2	OBC	55	109	95	114	62	455	66.42
3	SC	37	43	55	49	39	243	35.48
	Total	122	196	199	164	102	821	100.00
	% to total	13.73	23.87	24.24	19.98	12.39	100.00	

Activities of Project

5.1 PRA and Baseline Survey of Five Villages
5.2 Distribution of HYV Seeds (Gram)
5.3 Income Generating Activities
5.4 Formation of Seed Bank in Each Village
5.5 Demonstration and Introduction of Vermi-compost
5.6 Increasing Forage Production.
5.7 Human Development Activities (Capacity Building of Farmers)
5.8 Dissemination of Information and Technology
5.9 Documentation and Photography

5.1 PRA and Baseline Survey of Five Villages

(A) Collection of Secondary Data
1. Census Data
2. Revenue Data
3. Agricultural Data
4. Revenue Maps

(B) PRA Exercise
All the Five Villages

(C) Base Line Survey
All the five villages

(D) Writing of Survey Report

Formation of Natural Resource Management Committees

SN	Village	Name of President	No. of Members
1	Berda	Aziz Khan	8
2	Berkheda	Jagadish Lal	25
3	Khanota	Vikram Singh	19
4	Mahudiya	Parwat Singh	26
5	Moyakheda	Kalu Ram	19
	Total		97

5.2 Distribution of HYV Seeds for Rabi Crop (Gram)

SN	Village	No. of Beneficiaries	Total Area (Bigha)	Quantity of Seeds (Kg)	Total Production (Q)	Productivity (Q/Bigha)
1	Barda	4	8	[illegible]	13.00	[illegible]
2	Barkheda	2	4	50	7.50	[illegible]
3	[illegible]	0	0	0	0.00	0.00
4	Mahudiya	16	[illegible]	400	[illegible]	[illegible]
5	Moyakheda	3	11	[illegible]	[illegible]	[illegible]
	Total	28	[illegible]	[illegible]	[illegible]	[illegible]

5.3 Income Generating Activities

(A) Details of Self Help Groups in the CRISAT Project Villages

SN	Name of Village	Name of Self Help Group	Date of Formation	Total Members		Monthly Saving (Rs)	Total Saving (Rs)
				Male	Female		
1	Barkheda	Radha Sanvami	29.01.2009	0	11	20	660
2	Barkheda	Jai Maa Annpurna	29.01.2009	0	11	20	660
3	Mahudiya	Jai Dev Narayan	30.01.2009	0	11	50	1650
4	Barda	Ram Rahim	01.04.2009	0	11	20	220
	Total	4		0	44		3190

(B) Development of Nursery

SN	Name of Farmer	Village	Total Area (Bigha)
1.	Nain Singh s/o Inder Singh	Barkheda	1.0

5.4 Formation of Seed Bank in Villages

SN	Village	Name of Person	Quantity of Seeds (Qtl)
1	Barda	Rajendra Singh	3.50
2	Barkheda	Sardar Singh	1.50
3	Khanota	-	-
4	Mahudiya	Ramesh Kumar - 1.50 Parwat Singh - 5.00 Kanwar Singh - 1.00	9.50
5	Moyakheda	Bapu Lal	1.50
	Total		15.00

5.5 Demonstration and Introduction of Vermi compost

SN	Village	Name of Beneficiaries	No. of Beds
1	Barda	[illegible]	1
		[illegible]	1
2	Barkheda	Nain Singh s/o Inder Singh	1
		[illegible]	1
		[illegible]	1
3	[illegible]	[illegible]	1
		[illegible]	1
		[illegible]	1
		[illegible]	1
		[illegible]	1
4	Mahudiya	[illegible]	1
		[illegible]	1
		[illegible]	1
5	[illegible]	[illegible]	1
		[illegible]	1
	Total		[illegible]

5.6 Increasing Forage Production

Pasture Land Development

SN	Village	No. of Beneficiaries	Total Area (Bighs)
1	Barda	42	115
2	Bedkheda	8	77
3	Khanota	5	14
4	Malandiya	14	200
5	Mayakheda	42	120
	Total	51	526

5.8 Human Development Activities (Capacity Building of Farmers)

(A) Training of Staff

1. Micro Planning Training
2. Community Organisation, CARD, Ujjain

(B) Farmers Training Programs

SN	Village	No of Trainings	No. of Participants
1	Barda	1	15
2	Bedkheda	1	25
3	Khanota	1	31
4	Malandiya	1	30
5	Mayakheda	1	41
	Total	5	854

5.8 Human Development Activities (Capacity Building of Farmers) Cont.....

(C) Exposure to ICRISAT, Hyderabad During 5 -7 Feb.2009 and IDE, Dewas on 4 May, 2009

SN	Village	ICRISAT Visit	Dewas Visit
		No. of Farmers	No. of Farmers
1	Barda	1	2
2	Bedkheda	1	2
3	Khanota	1	2
4	Malandiya	1	2
5	Mayakheda	1	2
	Total	5	10

5.9 Dissemination of Information and Technology

1. Arranging Village Level Meetings - 32
2. Farmers Training Programs
3. Consultation with Research Organisations.
   1. KVK, Shajapur
   2. Agricultural Collage, Sihore
   3. Agricultural University, Jabalpur
   4. IDE (India), Bhopal

5.10 Documentation and Photography

1. Documentation of Each Village Meeting with proceedings
2. Collection of Patwari Map of Each Village.
3. Collection of Land Use Data of Individual Village.
4. Report Wiring of Base Line Survey
5. Report Writing of Exposure Visits.
6. Photography of Various Events

5.11 Linkages developed with Other Departments

1. Agricultural Department, Agar.
2. Horticulture Department, Agar
3. Krishi Vigyan Kendra, Shajapur.
4. Sazlos Foundation, Indore.
5. International Development Enterprises (India), Bhopal.

5.12 Problems in the Project Execution

1. Lack of Proper and Timely Guidance and Instructions
2. Delay in Required Inputs i.e. Seeds, Fertilizer, Nutrients etc.
3. Non Availability of Soil Testing Reports

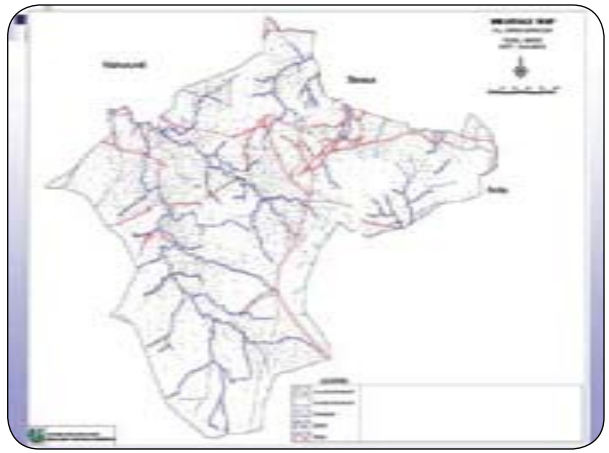
5.13 Future Plan

- Regular meetings with villagers.
- Initiation for construction of vermin pits in the Villages.
- **Preparation of GIS Maps of All the Villages for Detail Analysis and Interpretations**
- Identification of Beneficiaries and Estimation of their Seed Requirements for Kharif Season.
- Arranging Animal Camps for Animal Health and Productivity Enhancement
- Detail Analysis of Integrated Nutrient Management.
- Introduction of Drip Irrigation among Selected Farmers.
- Establishment of Kitchen Gardens among Farmers
- Initiation for Increase in Fodder Production by Induction of New Grass Varieties
- Monitoring of Agricultural Research Activities under the ICRSAT guidance.
- Formulation of New Project According to Peoples Needs.

Application of Advanced Technology

GIS Based Planning and Mapping of Project Area

(Suzlon Support)

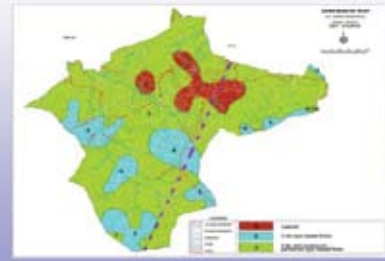


Barda Barkheda

Relief Map

Barda Barkheda

Geological Map



Barda Bukheda

Land use Map

Barda Bukheda

Soil Map

Barda Bukheda

Watershed Activities

Thank You

Centre for Advanced Research & Development

E-7/803, Arera Colony, Bhopal – 462 016 (M.P.)

TATA-ICRISAT-ICAR Project Review and Planning Meeting in the area of productivity enhancement and minimizing land degradation for improving livelihoods in Jhabua District of Madhya Pradesh
(12th to 13th May 2008, at IISS, Bhopal, M.P.)

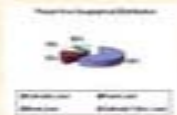
SRTT– CINI PROJECT

GRAMIN VIKAS TRUST – JHABUA (M.P.)

Biophysical and social constraints

1. Degraded soils with poor fertility.
2. Acute fodder scarcity for the livestock.
3. Poor socio economic base of the farmers.
4. One - two heads of cattle, several goats and some poultry birds.
5. Combined average income just - below poverty line.
6. Lack of suitable and early crop varieties.
7. Non-adoption of package of practices.
8. Non-use of recommended plant protection measures.
9. Lack of marketing and credit facilities.

Bio-physical and social constraints, Cont.



1. **Gender: Women** are involved in almost all the activities including agriculture, livestock grazing, firewood collection, marketing etc.
2. **Livestock:** Animal draught power is the main means of ploughing throughout this region. Animal manure is widely used.
3. **Tree and Forest:** Common species in these area are, Neem, Mahua, Sal, Tendu, Palas, Karanj, Tamarind, Ber etc. Mango, Sapota, Custard apple, Guava, Drumstick, Papaya, Lemon etc. are the main horticulture plants generally found in the homestead area of the household
4. **Food Security Position:** Migration is 50-60% and seasonal migration is much more higher i.e. > 80%. After short harvesting poor people leave their houses in search of job.

Rainfall (in mm)

	2003	2004	2005	2006	2007	2008
Jhabua Block	1137	1343	749	1555	1309	656
Jhabua District	1112	1113	734	1503	1459	637

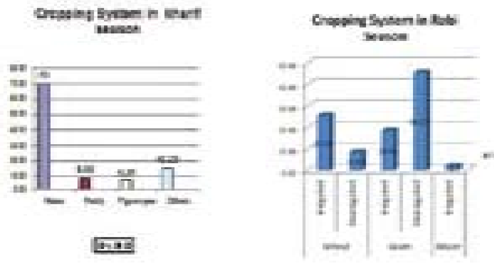
Topography

% of Cultivable Land	% of Slope
20 to 25%	2 to 3%
30 to 35%	3 to 20%
40 to 45%	>20%

Soil Type

Type of Soil	Area Occupied in %	Depth in cm	Clay %	Silt%	Sand%	pH	Remarks
Deep Black Cotton Soils	20	40	40-50	21	35	7-8	Occurs in low land area, suitable for maize, cotton, and soybean crops
Mix Red and yellow Soils	15	20-25	35	23	42		Occurs on slopes and sandy to sandy loam, suitable for black gram, green gram, maize, jowar, and red gram.
Skeletal Soils	18	7-15	9	32	40	6-7	Composition of stones of 50 to 250 grams.

Major Cropping Systems

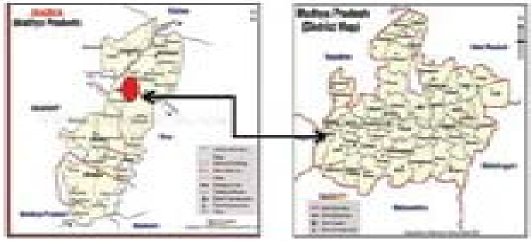


Opportunities for doubling the Agricultural productivity

1. Opportunities for Crop Improvements: Improved Seeds
2. Opportunities for Agronomic Interventions:
   - Land preparation
   - Use of improved varieties
   - Seed treatment
   - Seed treatment with bacterial culture
   - Sowing method, seed rate and spacing
   - Composting and Green Manuring
   - Fertilizer Application
   - Weed management
   - Plant protection against insect pests
   - Rouging of disease infected plants
   - Agriculture tools and implements
3. Opportunities for Soil Health Improvements: Vermi Composting, Composting, Green Manuring, Deep Ploughing etc.
4. Opportunities for Capacity Improvements: PoP, IPM, INM, PIM, Low Cost Techniques
5. Scope for ITK Documentations and Dissemination

TATA-ICRISAT-GVT Project Progress

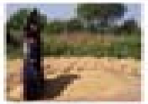
1. Programme Area



Kharif 2008 Trials Results

INM Trials Results Yield data (q/ha) in Hatiyadeli Village

Topo-sequence	Crop	Variety	Total Trials	Control (q/ha)	INM (q/ha)	% over control
Lower Land	Paddy	Ashoka 2008	2	18.23	22.93	25.82
	Soybean	JS 335	3	16.41	16.54	1.[illegible]
	Soybean	JS 9305	4	18.45	19.31	25.88
Middle land	Paddy	Ashoka 2008	2	17.5	22.25	27.23
	Soybean	JS 335	4	17.23	19.09	10.79
	Soybean	JS 9305	4	16	20.23	26.44
	Maize	JKM 421	2	18.23	28.25	[illegible]
Upper Land	Soybean	JS 335	2	15.91	19.59	23.57
	Soybean	JS 9305	2	13.5	17.24	27.71
	Maize	JKM 421	2	17.6	22.30	26.70



Rabi 2008-09 Trials Results

INM Trials Results Yield data (q/ha)

Crop	Variety	Total Villages	Total Trial No	Control (q/ha)	INM (q/ha)	% over control
Gram	JGK-2	4	21	12.3	15.30	24.39
Wheat	HI-1418	4	12	17.20	22.80	32.56

Planning for Kharif 2009

	Name of village	Name of the Crops	Name of variety	Extra Trials	Per Trial Plot Size (Sq.m.)	Total Area under Trials (Sq.M.)
1	Gundipada	Maize	BH-421	4	2000	8000
		Urd	BH-07	2	2000	4000
		Mung	Pusa Baisakhi	2	2000	4000
		Soyabean	JS-9305	8	2000	16000
		Paddy	Ashoka 200	1	2000	2000
		Maize+Arhar	DPL-07	4	2000	8000
		Cotton+soyabean		4	2000	8000
2	Jeelguthar	Maize	BH-421	4	2000	8000
		Urd	BH-07	2	2000	4000
		Mung	Pusa Baisakhi	2	2000	4000
		Soyabean	JS-9305	8	2000	16000
		Paddy	Ashoka 200	1	2000	2000
		Maize+Arhar	DPL-07	4	2000	8000
		Cotton+soyabean		4	2000	8000
3	Jharpada	Maize	BH-421	4	2000	8000
		Urd	BH-07	2	2000	4000
		Mung	Pusa Baisakhi	2	2000	4000
		Soyabean	JS-9305	8	2000	16000
		Paddy	Ashoka 200	1	2000	2000
		Maize+Arhar	DPL-07	4	2000	8000
		Cotton+soyabean		4	2000	8000

Planning for Kharif 2009

#	Name of Village	Name of the Crops	Name of Variety	Total Trials	Per Trial Plot Size (Sq.m.)	Total Area under Trials (Sq.M.)
1	Matiyaniali	Maize	BH-421	4	2000	8000
		Urd	BH-07	2	2000	4000
		Mung	Pusa Baisakhi	2	2000	4000
		Soyabean	JS-9305	8	2000	16000
		Sesamdhni	Local	2	2000	4000
		Maize+Arhar	DPL-07	4	2000	8000
		Cotton+Soyabean		4	2000	8000
2	Garwada	Maize	BH-421	4	2000	8000
		Urd	BH-07	2	2000	4000
		Mung	Pusa Baisakhi	2	2000	4000
		Soyabean	JS-9305	8	2000	16000
		Paddy	Ashoka 200	1	2000	2000
		Maize+Arhar	DPL-07	4	2000	8000
		Cotton+Soyabean		4	2000	8000

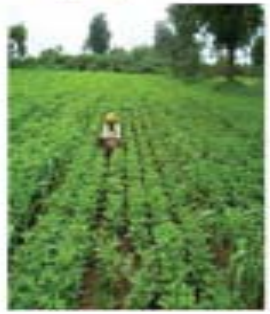
Seed Producer Coop. Society-Garwada

CInI

SRTT (CInI)



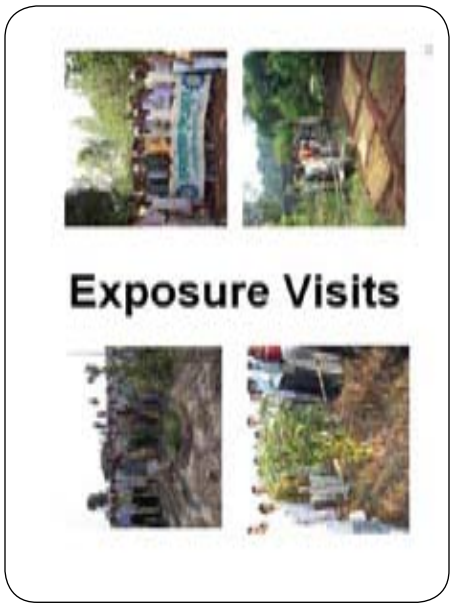

SRTT (CInI)



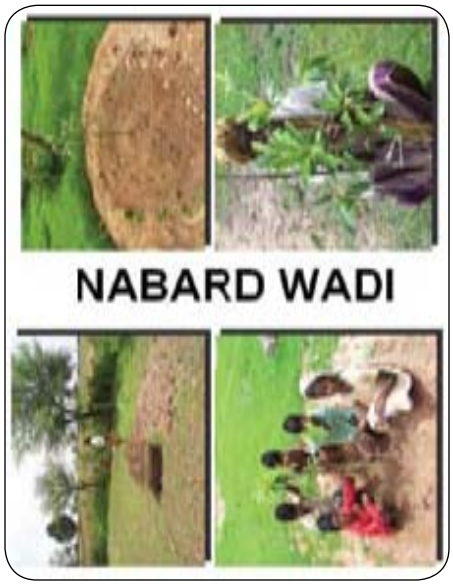

SRTT (CInI)




SRTT (CInI)



Exposure Visits


NABARD Wadi


NABARD WADI


NABARD Wadi

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GREGS W/s


GREGS W/s


THANK
YOU

FES

FOUNDATION FOR ECOLOGICAL SECURITY

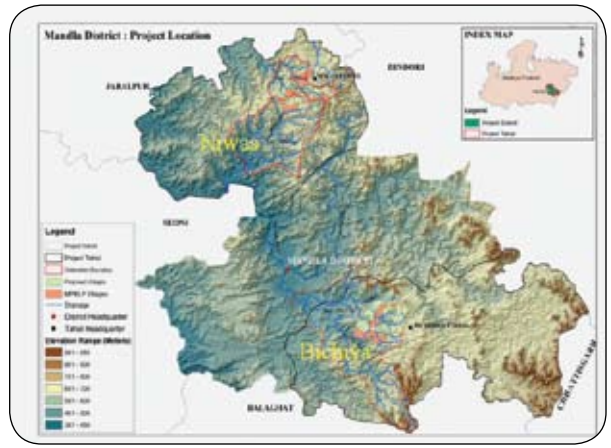
Spear Head Team (SHT) Mandla

We work towards the ecological restoration and conservation of land and water resources and setting in place the processes of coordinated human effort and governance towards that end

FES

We are

- in five eco-regions of the country
- with 1200 village institutions
- with hundred thousand rural families
- on 80 thousand hectares of forest and common lands
- in 24 districts of six states
- About 200 staff members

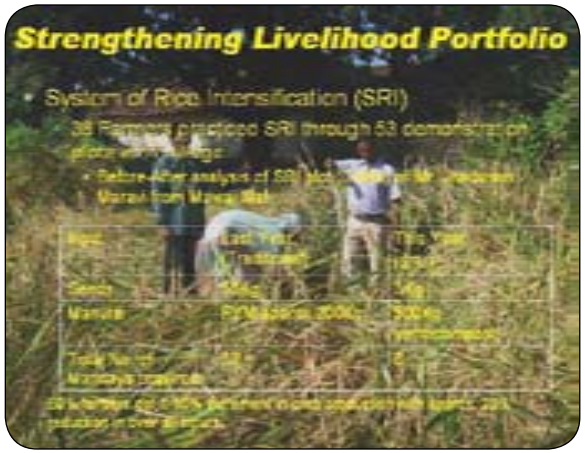


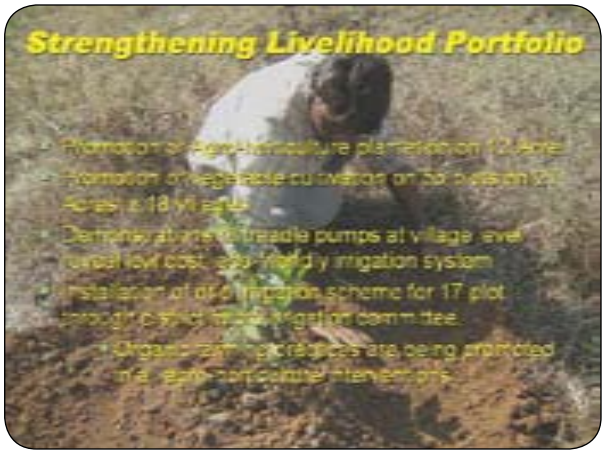

•The team was initiated in November, 2005 with the
invitation from MPRLP to work as TST
•Project Area covers 52 villages across 17 Panchayats in
2 Blocks
•MPRLP supported NREGS project
•Better Natural Resource Management and Governance
through leveraging NREGS under CRI supported by
SRTT
•Integrated water and resource management for
improved productivity of farming systems through
participatory research cum demonstration supported by
TATA- ICRISAT


Watershed Interventions


Watershed Interventions


Strengthening Livelihoods Portfolio
•53 no. of SRI plots in 17 villages
•55 no. of vegetable plots in 18 villages
•12 acres of horticulture plots
•Drip irrigation in horticulture plots


Strengthening Livelihood Portfolio
System of Rice Intensification (SRI)


Strengthening Livelihood Portfolio

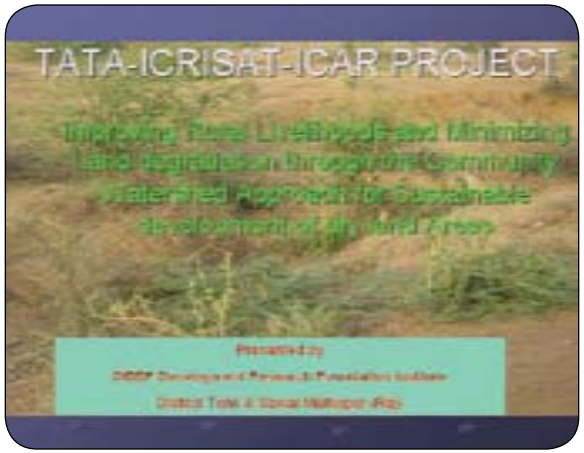

Building Capacity of the Community


Progress under TATA – ICRISAT Project
In Kharif season
- two trial plots of paddy (2 acre) and 2 plots of Maize (1 acre)
- Micro nutrients such as Borex, Zinc sulphate
In Rabi season
- Chickpea trials with 9 farmers in 4.4 Ha
- 450 kg of two varieties, ICCC37 and JG11
- Agribor and Zinc sulphate
- Avg. Yield for trial plots – 900 kg/ha
- Avg. yield for Control plots – 450 kg/ha

Activities Planned for Year 2009

SN	Activity	Area (in acres)
1	INM	30
2	Intercropping	10
3	Sole cropping	5
4	Kitchen Garden	5 Farmers
5	Vermicompost	3 units
6	Gliricidia Plantation	40 acres


Thank You



Objectives

- Community watershed approach at nucleus benchmark watersheds for enhancing productivity and reducing land degradation in two districts and to use these sites as centers of learning for scaling-out the benefits across the two districts.
- To scale-out the benefits of productivity enhancement and community watershed management with technical backstopping in the target agro-eco-region of Rajasthan.
- Capacity building of lead farmers, development workers, and consortium partners in the target region, and provide technical support to the development agency in the area of community watersheds through establishment of a National Support Group for community watershed development.

Challenges in Semi arid regions

Goal

To improve livelihoods through sustainable use of natural resources by undertaking science-led development in consortium mode with equity and inclusion in Semi arid agro eco regions

Project Location

Project Activities

- Baseline survey
- Constraint identification
- Farmers' participatory evaluation & Selection of varieties
- Micronutrient amendment balanced nutrient mgmt trials
- Village level seed banks
- Vermi composting
- Capacity building
- Water saving technology
- Activity convergence

Demographical Features & Land use Pattern

Village Name	HH	Land use pattern (ha)					
		Forest	Irrigated	Un irrigated	Cultivable waste land	Uncultivable Waste land	Total
Dharola & Bairwa ki Dhani (Tonk)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Juwar (Sawai Madhopur)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Major crops in the project area

S.No.	District	Village	Season	Major Crops
1	Tonk	Dharola & Bairva ki Dhani	Kharif	Maize, Pearl Millet, Sesamum, Groundnut, Black/Green Gram, Sorghum
			Rabi	Mustard, Wheat Gram, Barley
			Zaid	Lucern
2	Sawai Mathopur	Juwar	Kharif	Maize, Pearl Millet Sesamum
			Rabi	Mustard, Wheat, Gram
			Zaid	Lucern

Convergence of the programme

- Farmer's Participatory Action Research Project : ICRISAT
- Water saving technology with Department of Agriculture Extension
- Productivity enhancement programme with Pioneer seed company

Crop demonstration in Kharif 2008

Crop Demonstration in Rabi 2008-09

Summer 2009

Sprinkler irrigation system in Dharola village

Vegetable trails in Dharola village

Sudan grass in Dharola village

Summer Maize in Dharola village

Ave. Crop yields from Tonk & Sawai Mathopur watersheds with best-bet nutrient management in TATA –ICRISAT project

Crop	Farmer's Practice		Best bet Practice	
	Tonk	S. Mathopur	Tonk	S. Mathopur
Wheat	34	40	41.5 (22)*	48 (20)*
Gram	15	13	18 (24)*	17(30)*
Mustard	14	12.5	17 (21)*	14(12)*
Chick	8.5	8.8	11 (22) *	11(14)*
Bajra	22	23	24(8) *	26 (13)*
Maize	26	29	28 (8)*	32 (10)*

* % increase over farmers practice

Capacity building in project Area

Vermi composting

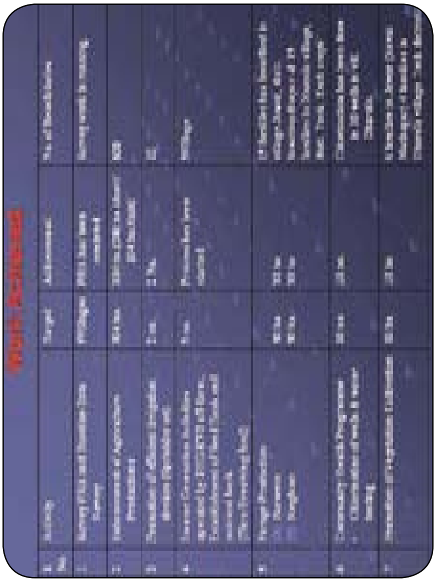
Objectives

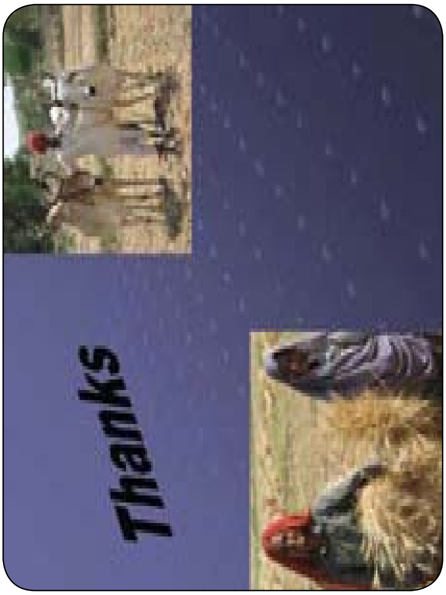
1. Proper utilization of Animal dungs, and maintain the maximum nutrients.
2. Reduce the dependency of chemical fertilizers and promotes to organic farming.
3. Improve the Soil as well as human health.

Rallies on Environment awareness, Health and hygiene

Objectives

1. Develop the awareness about our environments and global warming for their effects on human health.
2. Develop the awareness about the ladies rights in the globes.
3. Develop the awareness about the soil and water conservation & adoption of new agriculture technology.




Thanks

SRTT-ICRISAT-Project

PRADAN, Gumla
Professional Assistance for Development Action

About PRADAN

- Mission Statement: Impacting Livelihoods to Enable Rural Community
- Working in 8 states in Central India
- 400 Professionals from different technical backgrounds

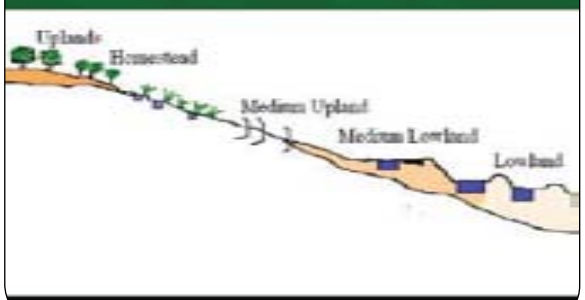
Brief about Gumla

- AE Zone : VII
- Rainfall : 1200-1400mm
- Land terrain : Undulating
- Acidic soil : pH range 4-4.5
- Tribal population : 70%
- One of the poorest district of Jharkhand
- Agriculture is the primary source of income

PRADAN'S Presence in Gumla

- SHGs:777
- Families:13990
- Activities
  - Agriculture
  - Poultry
  - Goat rearing
  - Watershed
  - Horticulture
  - Lac

Topo-sequence of AE Zone VII



Objectives of the Project

- Enhancing productivity by using good quality seeds & application of macro and micro-nutrients
- Increase yield of the project-village by 150% after 5 years from initiation of the project
- Growing green manure: Glyricidia on field bunds
- Improving water use efficiency: Drip irrigation
- Increasing cropping intensity by using fellow low-lands after paddy harvesting
- Improving livelihood: Vermicomposting
- Monitoring rainfall, temperature & humidity

Why Teleya ???

- Completely tribal village located centrally
- Agriculture – Primary source of livelihood
- Poor village with low agricultural productivity
- Low quality land (Degraded soil, mostly hilly)
- High aspiration to adopt new technology
- From mono-cropping to Multi-cropping
- Having PRADAN promoted SHG and Farmers club
- Shifting the villagers from alcohol to agriculture
- Central location of village for replication in future

TELEYA AT A GLANCE

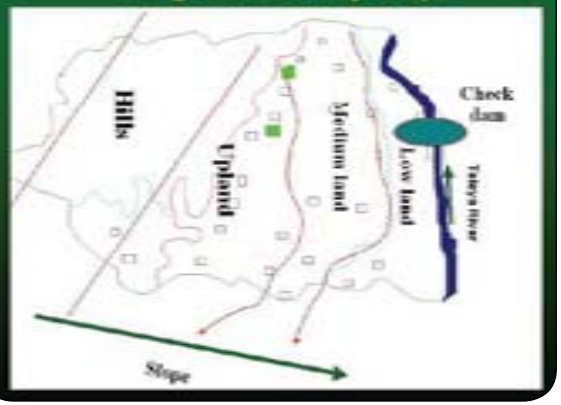
Total Land	: 273.72 Ha
Cultivable land	:127.2 Ha
Total Households	:72
Total Population	: 382
ST Population	:100%
Community	: Oraon
Literacy	: 29.58%
No of SHGs	: 4
Farmer's club	:1

TELEYA AT A GLANCE

- School : 1
- Connectivity
  1. Main road (NH) : 8 km
  2. Telephone : Raidih (8 km)
  3. Railway Station : Ranchi(112 km)
  4. Market : Raidih, Gumla, Jashpur

Teleya Village

Village Resource Map-Teleya



Resources-Land

- 172.2 Ha is cultivable land.
- 65% of the total land is up and medium land.
- Undulating Acidic soil with high run off.
- Average land holding per family is 2.5 acre.

Water Resources

- Lift Irrigation : 3
- Homestead Wells : 33
- Ponds : 2
- Checkdam : 1

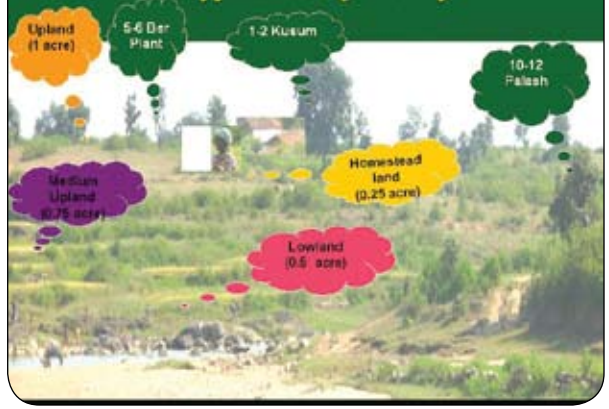
Human Resource

- Generally each family consist of 4-5 members.
- At least 2 people available to do agriculture in each family.
- Both male and female are equally potential for agricultural works.
- Potential Farmers' club
- Vibrant Youth club

Resource-Forest

- Forest covers more than 30% land
- Huge numbers of forest trees like Sakua, Sal, mohua, Tamarind, etc.
- People use forest trees as fire wood.

A Typical Family at Teleya



Livelihoods

- Agriculture is the prime source of livelihoods.
- People have started to take vegetables as a source of income.
- Forest based products (mohua, firewood) selling periodically.

Activities in 2008-09 under this Project

- Concept sharing
- Motivated 30 farmers to participate
- Soil testing
- Paddy intervention
- Kharif cash crops : tomato, maize, black gram, beans (sem), ground nut
- Rabi : Chickpea with 26 farmers in 5.4 acres
- Summer : Green gram with 18 farmers
- Quality seeds and nutrients assured
- Application of macronutrients&agribore Zinc sulphate
- Adopting seed priming techniques
- Regular technical training
- Vermicompost tanks for 30 farmers.

Process

- Motivational trainings
- Selection of farmers and land for particular crop
- Analyzing soil test results
- Pre nursery trainings
- Seed treatment trainings
- Regular follow ups
- Weekly Farmers club meetings
- Used ¾ of land for new approaches with recommendations and rest ¼ under control
- Exposures from neighboring villages
- Collection & Analysis of data and planning for next season

Soil test results

- Low Percentage of organic carbon
- Phosphorous deficiency
- Very low Sulphur, Zinc & Boron content

Output data

Sl No	Crops	Average land used	Seed	Under the project	Existing
1	Tomato	20 decimal	18gm	5200 kg	2600 kg
2	Paddy	50 decimal	5 kg	1400 kg	1000 kg
3	Black gram	25 decimal	3 kg	80 kg	40 kg
4	Groundnut	20 decimal	6 kg	60 kg	40 kg
5	Chick pea	20 decimal	6 kg	50-130 kg	10 kg

Significant income data

- 10 farmers earned Rs 10,000-15,000 from tomato & sem in Kharif
- 8 farmers earned Rs 8,000-10,000 from tomato in Kharif
- 10 farmers earned more than Rs 5,000 from tomato in Kharif

What we couldn't do?

- Maize and finger millet due to delay of receiving the seeds
- Unable to achieve the expected output in Chickpea due to water crisis (mostly small seeded var.)
- Use of trio cultivator

Snap-shots

Snap-shots

Snap-shots

Snap-shots

Trainings

Motivational training &Planning with members

Some interventions…..

Plan for 09-10

- Glyricidia cultivation
- Paddy(SRI), Tomato, Black Gram Bean, Finger Millet, Chilly, Cabbage Groundnut in Kharif
- Chick pea after harvesting paddy
- Focus on growing cash crops to give additional income
- Wire-staking in tomato

……contd

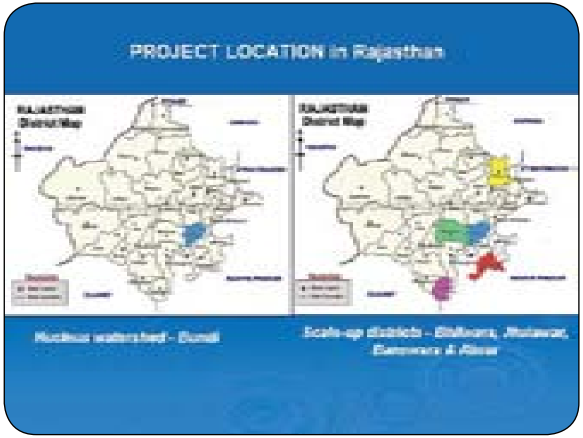
…..plan for 09-10

- Include another 100 families
- Use of macro & micronutrients in all crops
- At least two cole crops in Rabi & creepers in Summer
- Seed storage
- Involving youth club
- Exposure of villagers to ICRISAT Centre, Hyderabad


Thank you for your
kind attention

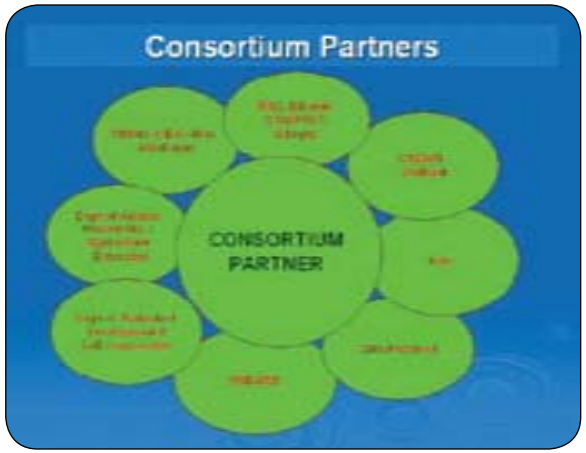
Objectives

- To consolidate the science-led farmer-centric community watershed approach at nucleus benchmark watersheds for enhancing productivity and reducing land degradation in 5 districts and to use these sites as sites of learning for scaling-out benefits in the 5 target districts.
- To scale-out the benefits of productivity enhancement and community watershed management with technical backstopping in the target agro-ecoregion of Rajasthan.
- Capacity building of lead farmers, development workers and consortium partners in the target regions and provide technical support to development agencies in the area of Community Watershed.



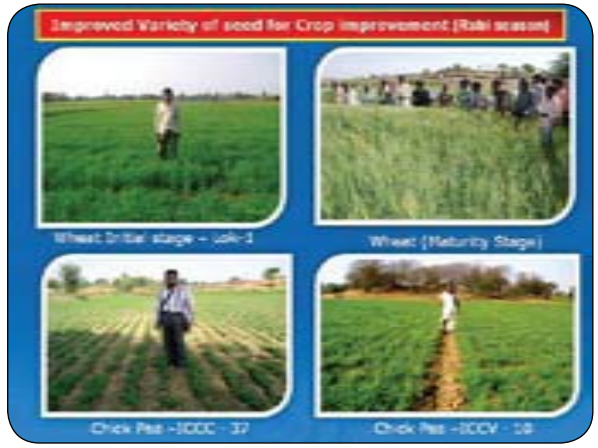
Demographic Informations

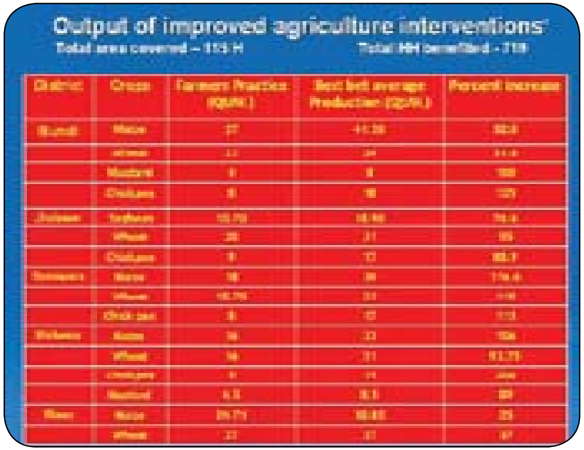
District	Targeted Villages	Population (HH)	Land use pattern (H.)					
			Forest	Irrigated	Un irrigated	Cultivable waste land	Unculturable Waste land	Total
Bundi	Thana, Govardhanpura & Vijaygarh	4024 (685)	435	477	731	201	1197	3031
Jhalawar	Jhumki, Mandi, Nayapura	3132 (500)	70	220	375	157	61	883
Banswara	Tedi, Pali Chhatri, Parsoliya	1872 (312)	8	97	271	16	88	480
Bhilwara	Dhad, Gaga Ka Kheda, Takoda	2376 (487)	117	239	110	199	375	1040
Alwar	Dhamred, Dabbi, Arawara	7508 (1117)	141	663	704	144	100	1752
	Total	18922 (3104)	771	1696	2191	717	1811	7186
	%		10.73	23.6	30.49	9.98	25.2	



For improving Rural Livelihoods

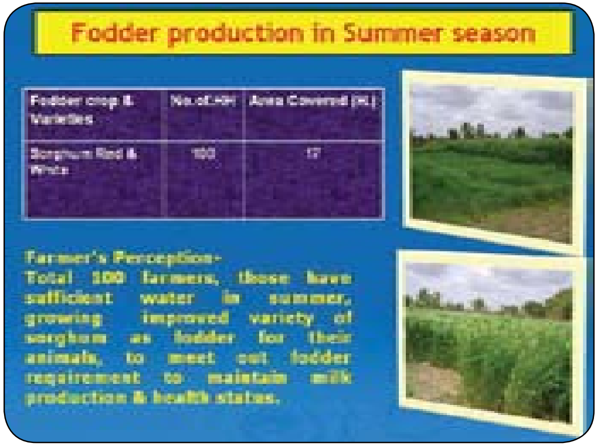
- Enhancement of Agriculture and Live stock productivity
- Forage production
- Balanced fertilization (Vermi compost)
- Income generation activities through group formation.
- Technical backup for Skill development
- Dissemination of tested technology.




Output of improved agriculture interventions
Total area covered – 115 H
District
Crops
Farmers Practice (Q/H.)
Best bet average Production (Q/H.)
Percent increase


Output of field trials 2008-09
T1: Farmers Practice (Local seed + fertilizer)
T2: Farmers practice with improved varieties of seed
T3: Improved practice (Improved varieties of Seed + fertilizer + Nutrients)
Average Production (quintals per H.)
CROP
Grain
Straw


Vermi compost practices
Objectives
Training
Commercial Model of Vermi compost
Vermi compost


Fodder production in Summer season
Fodder crop & Varieties
No. of HH
Area Covered (H.)
Sorghum Red & White
100
17
Farmer's Perception-
Total 100 farmers, those have sufficient water in summer, growing improved variety of sorghum as fodder for their animals, to meet out fodder requirement to maintain milk production & health status.

Increasing animal productivity

AI	481	481
Confirm Pregnancies	282	282
Deworming & Vaccinations	179	575

Deworming

Door step service of AI

Castration of the bullocks

Income Generation Actvities

- Total – 15 SHG Formed (165 Members)
- Goatry Initiated as IGA

Human resource development activity for skill enhancement

1. Exposure visit

ICRISAT Scientist discussed with the farmers

No. Participants	Date of Exposure	Place
58	14.01.09 To 16.01.09	ICRISAT, Hyderabad

Continue.....

2. Relevant training

Goatry (Ramawara)

Watershed management (Jhalawar)

Improved Agriculture practices

No. of Participant benefited	Total Training
774	15

Dissemination of tested technologies
1. Organization of farmers day and cross visit

Farmer's day in Banswara

Farmer's day in Jhalawar

Farmer'sday in Alwar

Farmer's day in Bundi

2. Publicity – News Papers

Farmers perception

- After the exposure in ICRISAT, farmers changed his mind and adopting improved agriculture practices in his field.
- Farmers adopted the Bio fertilizers for crop production.
- Farmers aware about the soil and water conservation measures – AF, BBF
- Farmers are using the improved seed and fertilizers after result of demonstrated trials in his field..
- Increase the Micro Nutrient Demand after impact of trials on productivity and wants to purchase in next season on payment basis.
- Continuous exposure, relevant training/ demonstration resulted change in cropping pattern.
- Farmers stored the new introduced improved seed for next coming season.
- Farmers are motivated to reduce the seed rate after demonstration of trials.
- Farmers want to mobilize the technical back up in their area for sustainable development.

Achievement in Bundi Watershed

1. Increase the seed and fertilizer shops in the area.
2. Increase the availability of Micro nutrient in the local market - Deveji ka Thana village.
3. Ninety per cent farmers use the improved variety of seeds & fertilizers in his field & near by villages.

Benjamin Kumpf, ICRISAT visited the local fertilizers of shop in Thana village

Visitors

Benjamin Kumpf, ICRISAT 24 To 25 Oct. 2008

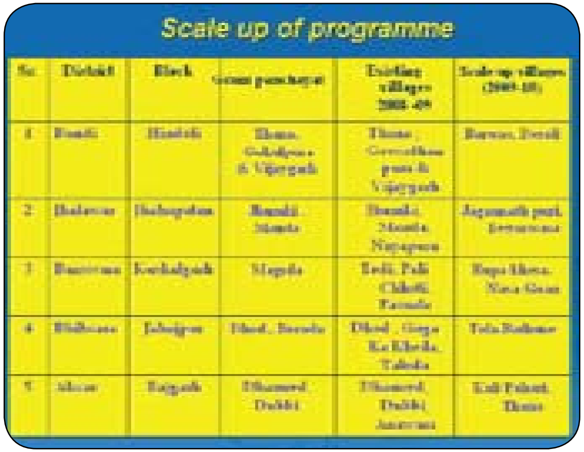
Continue....

Target Achievement (2008-09)

S.No.	Activity	Unit Target	Achievement	Beneficiaries
1	Baseline survey	5 districts	Done	
2	Productivity enhancement trials	50 ha X 5 districts	113 ha	113
3	Vermicompost	25 units X 5 districts	15 Nos.	15
4	Income generating activities	3 SHGs X 5 districts	15 groups	150
5	Increasing forage production	25 ha X 5 districts	17 ha	150
6	Increasing animal productivity and poultry based activities	2 X 5 districts	5 Nos.	150
7	Human resource development activity for skill enhancement	15 progressive farmers X 5 districts 25 farmers per course X 3 courses X 5 districts	3 Nos. 15 Nos.	50 300
8	Farmers Day at Watershed	5	5	250

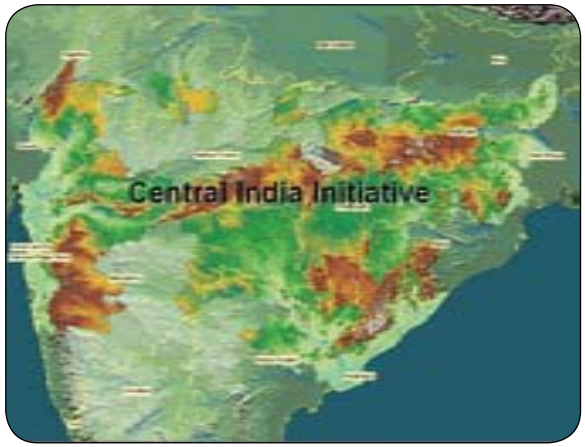
Work Plan 2009-2010

Sr.	Particulars	Interventions	Unit / Target
1	Baseline Survey	Socio economic survey	200 Families /watershed x 5 Watershed
2	Enhancement of agriculture	Varietal trials INM Trials Balanced fertilizations	100/ha. x 5 districts
3	Vermicompost		5 units x 5 districts
4	Increasing forage reduction		25 ha x 5 districts
5	Increasing animal productivity and poultry based activities	AI, Infertility camps	2 x 5 districts
6	Human resource development activity for skill enhancement	Exposure Training	15 progressive farmers x 5 districts 25 farmers per course x 3 courses x 5 districts
7	Dissemination	Farmers day at watershed	1 x 5 Districts



Scale up of programme

Sr.	District	Block	Gram panchayat	Existing villages 2008-09	Scale up villages (2009-10)
1	Bundi	Hindoli	[illegible]	[illegible]	[illegible]
2	Jhalawar	Jhalrapatan	[illegible]	[illegible]	[illegible]
3	Banswara	Kushalgarh	[illegible]	[illegible]	[illegible]
4	Bhilwara	Jahazpur	[illegible]	[illegible]	[illegible]
5	Alwar	Rajgarh	[illegible]	[illegible]	[illegible]



Initiative Background

- 18 to 25 degrees belt stretching from Gujarat to West Bengal - hilly and undulating
- High Rainfall – high runoff, reasonable forest cover
- 90 million tribal population (70% of tribal population of India)
- Low literacy, high poverty, land and water productivity far below potential
- Low use of modern technology in agriculture

Central India Initiative (CInI) Objective

The CInI envisages a series of livelihood projects across the region, addressing core issues aimed at alleviating poverty amongst tribals in a sustainable manner.

Central India Initiative: IWMI-Tata's Recommendations

- [illegible]

The focus is on stabilizing Kharif crops through the creation of decentralized water harvesting structures near farm lands.

- [illegible]

The focus is on promotion of 'Wadi' (orchards) and creation of water harvesting structures such as nallah and cement bag bunds.

- [illegible]

The focus is on promotion of 'Wadi' (orchards), developing and revival of irrigation systems to participatory approach and package of practices for crops like cotton, soyabean etc.

- [illegible]

The focus is on Community Managed Natural Resources: large check dams and lift irrigation systems.

Collectives for Integrated Livelihood Initiatives (CInI)

CInI

Thematic areas CInI Focus

- Kharif Paddy Stabilization
- Kharif Maize Stabilization
- Diversion based Irrigation (Revival of traditional irrigation systems)
- Non Timber Forest Produce
- Microfinance and Livelihood
- Community Based Organizations

Kharif Paddy Stabilization Strategy

- Ensuring Food Security of Tribal households through stabilization of paddy production
- An effort to enhance the livelihood of tribal population through intensification of rice cultivation with improved technology interventions, strong extension and assured irrigation support.
- Assurance of good yield under improved practices encourages farmers to get involved in other cash promoting livelihood interventions.

CInI's Vision for Kharif Maize Stabilization

- Vision: One of the strategic thematic area to make heavy dents on tribal poverty in select pockets of Semi Arid Central Indian Tribal belt
- Mission 1: To demonstrate a high yielding user friendly (cost effective and easy to accept) PoP for Maize production in tribal areas of Central India
- Mission 2: To Highlight maize as lucrative multipurpose commercial crop at local level market initially and later at national and international level.

Diversion based Irrigation Management

- To establish DBI as a supporting tool for ensuring food security in Tribal dominated Central Indian States
- Enables poor farmers living in difficult terrains to double their incomes by taking the second crop using diverted water flows.
- Reduces their need for migrating in search of work.
- Technically such schemes are feasible only in far flung, remote and tribal areas usually facing neglect by the State
- Investments is less compared to other sources of irrigation
- O & M cost is less

Non Timber Forest Produce

Vision: Identify key regional NTFPs and promote them as a profitable and viable option for income generation, enhance tribal livelihood and conservation of forest resources.

Financial services for supporting livelihood

Financial services for supporting livelihood

- Developing appropriate models around the existing themes such as Kharif Paddy, Kharif Maize and other Agricultural Interventions to promote livelihood interventions supported by proper financial services
- Enhancing quality of financial services by improving the quality of the SHGs promoted by different partners
- Building strong people's institution so that these institutions can take forward the program after initial support by Trust and ensure operational as well as financial sustainability
- Increasing outreach to financially include the poorest through area saturation approach
- Strategic Partnership with mainstream policies and financial service providers to facilitate a better financial environment for poorer.


Community Based Organizations
Poverty Mitigation through strengthening Community-Based
Institutions promoted around the Diverse Sectoral Themes
of Tribal livelihoods-Civil


Thank You

SRTT – CInI PROJECT

Seraikela – Kharsawan District

Area

Demography

- Total House hold – 1120 HH
  ST- 60.18% SC- 7.32% OBC- 30.09% GEN- 2.41%
- Average Rainfall – 1200 to 1500 mm
- Total treatable area – 3500 Acres
- Total Cultivable land – 1600 Acres
- Mono crop – paddy (Broadcasting)
- Yield rate – 7-8 Qntl./Acre
- Current Practices HYV Paddy(Transplanting)
- Yield – 15-18 Qntl./Acre

Background

- *Backward agriculture, unstable kharif crop Primarily rain fed - broadcasting*
- *Adherence to traditional technologies and modes of production*
- *High degree of dependence on forests and migration; non-farm employment options more common, to Brick Kilns in nearby areas / industrial area.*
- *Access to financial services, knowledge kiosks, markets is least developed.*
- *Open grazing*
- *Defunct Lift Irrigation Systems*
- *Debt ness*

Project Objective

Project Details

PROJECT TITLE : *Enhancing livelihoods of tribals in Seraikela-Kharsawan district of Jharkhand through creation of water resources under Sir Ratan Tata Trust-Central India Initiative Programme.*

GOAL : *Creating Sustainable livelihood in tribals through creation of water resources.*

COVERAGE AREA : 16 Villages

STARTING YEAR : 2004

KHARIF (HYV & TRANSPLANTING)

Adoption of HPV + Trans. Paddy	750 Acres
% Area under HYV & Transplanting	46.07%
% of benef. adoption(Total-1120 HH)	55.00%
Yield Rate	15-18 Qntl./Ac.

Agriculture - *Rabi Crop*

Physical Intervention

- Pond – 38 Nos.
- Irrigation – 52 Nos.
- Low Cost Checkdam with Intake well – 9 Nos.
- L. I. System – 4 Nos.

Total 605 acres irrigation capacity created in three years in different season

Capacity Building

VILLAGE INSTITUTION

- 16 Village Development Committee
- 64 Water User Group
- 20 Self Help Group

Wasteland Development

Outcome / Impact

Agriculture Extension

- Increase in area under HYV Kharif paddy from 0% to 25% of total cultivable land.
- Approx. 30% of total house hold adopted HYV paddy cultivation. Increase in Transplanting of paddy from 0% to 25%
- Food security has increased from 7-8 month to whole of the year.
- Increase in yield of local paddy from 7-8 Qntl./Acre To 15 qntl/Acre and HYV yield 18-20 qntl/Acre
- Cultivation of Summer paddy started.
- From Mono crop to cropping intensity to 1.33%
- Increase in area under Rabi crop from 25 Acres (1.5%) to 350 Acres (22%) of total cultivable land.
- No. of household adopted Rabi cultivation – 364 household (32%)
- Increase in income through Rabi cultivation .
- 3764365 cft. Additional capacity created by Pond.
- 33 Irrigation wells created
- 9 nos. Low cost chedi dam constructed
- 605 acres irrigation capacity created in three years in different season.

Contd....

Capacity Building

- Skill development of VDC in Physical work spl. In Engineering, organizing manpower
- Access to market
- Empowerment of women
- Confidence level increase
- Ownership feeling and more optimistic about their development
- They are more vocal
- Access to block and district for development work
- Working culture in group developed
- Economic activity at village level after paddy harvesting
- Accounting and book keeping knowledge of VDC at village level help them to enable take and manage the fund independently .
- Saving habit developed
- Office bearer of VDC can be utilized as trainers (for record keeping, accounting, book keeping) to water user group and SHGs as well as service provider to agriculture extension
- They are acquainted of cropping patter of Kharif & Rabi.
- Operational and mechanical knowledge of Lapsi machines.
- Checked migration

ICRISAT Initiatives with TSRDS(2008)

Soil Sample Collection

Kharif Cultivation(Black Gram)

Yield-15 Quintal/Hectare

Kharif Cultivation(Pigeon-Pea)

Yield-15 Quintal/Hectare

KHARIF CULTIVATION(Groundnut)

- Groundnut

CHICKPEA Details (17 Acres)

Riped Chick Pea

Vermicompost Unit in Progress

Exposure cum Training of other Villagers to SAHERBERA

Nursery raising of Gleryceda

Soil filling for raising of Nursery of Gliricidia and Jatropha by Women SHG's Group, Saherbera

Rain Gauge Installed at Saherbera

Measurement Taken by the Villagers:
1st March'09:- 33.5 mm
1st May'09:- 24 mm

Third Cropping

After Harvest of Chick Pea ,Vegetable Cultivation in Saherbera Village

Planning for Kharif(09-10)

- Upland Farming -150 Acres(Target)
- Cultivation of Pigeon Pea,Groundnut and Black Gram
- Extension in Four Villages
- Promotion of Micronutrient (Agribore,Zinc Sulphate) in Paddy Field

Press Clipping

Thank You

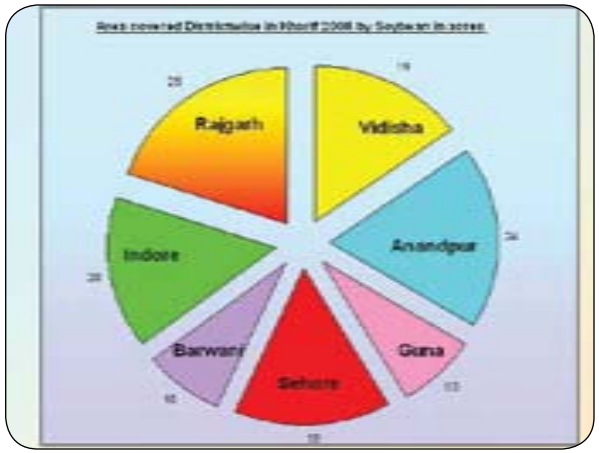

TATA-ICRISAT PROJECT,
MADHYA PRADESH
ICRISAT
TATA
Improving Rural Livelihoods and Minimizing Land Degradation through the Community Watershed Approach for Sustainable Development of Dryland Areas.


Objectives :

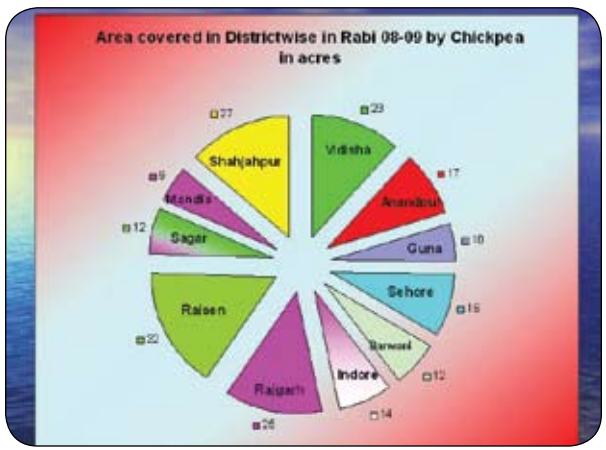

TATA
FES

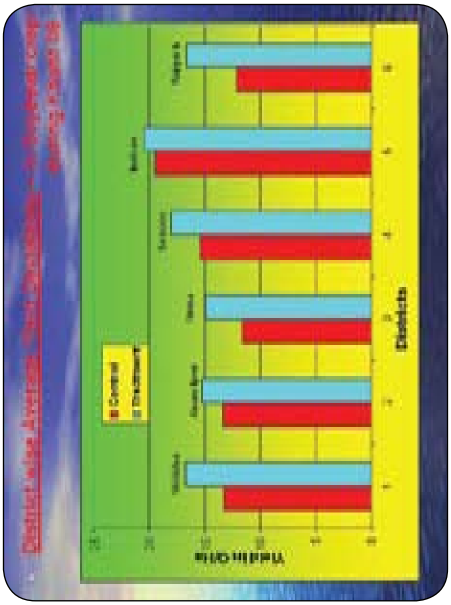

Madhya Pradesh
(District Map)
Rajasthan
Uttar Pradesh
Gujarat
Chhattisgarh
Maharashtra

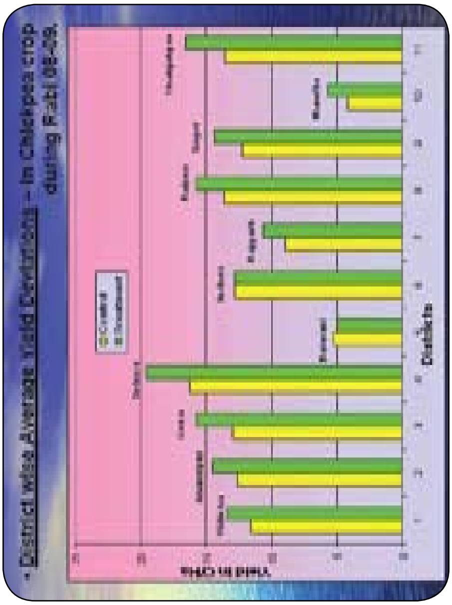
Sr.	District	Villages	No. of Beneficiaries	Area Covered (in Acres)
1	Vidisha	9	76	76
2	Anandpur	5	24	24
3	Guna	2	10	10
4	Sehore	5	19	19
5	Barwani	1	10	10
6	Indore	4	20	20
7	Rajgarh	4	25	25
	Total	24	227	227

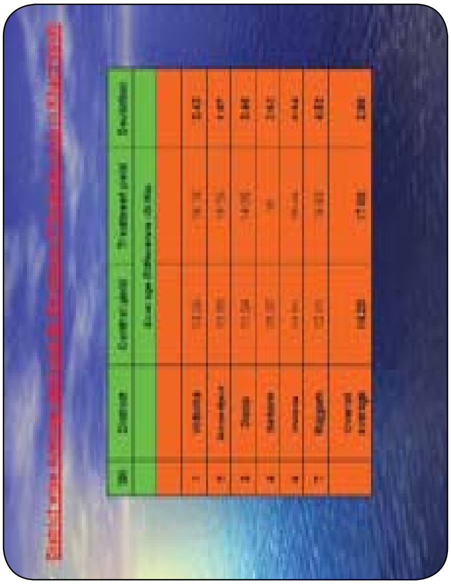


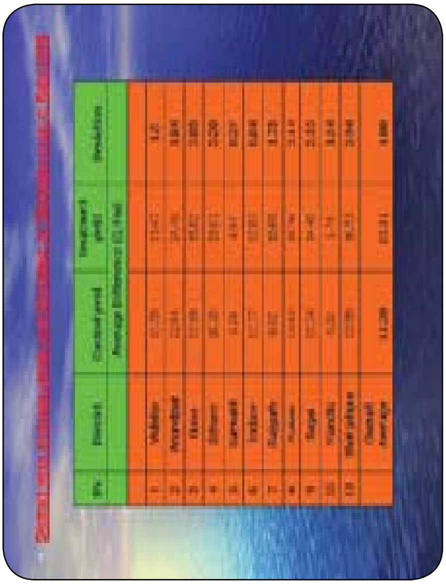
Sr.	District	Villages	No. of Beneficiaries	Area Covered in Acres
1	Vidisha	9	76	76
2	Anandpur	5	17	17
3	Guna	3	10	10
4	Sehore	5	19	19
5	Barwani	1	12	12
6	Indore	4	14	14
7	Rajgarh	4	25	25
8	Raisen	5	32	32
9	Sagar	7	12	12
10	Mandla	2	9	9
11	Shahjahpur	4	27	27
	Total	30	197	197




Districts


District wise Average Yield Deviations – In Chickpea crop during Rabi 08-09
Yield in Q/ha
Districts





SN	District	Activity in Kharif (Rs)	Activity in Rabi (Rs)	Total
1	Vidisha	[illegible]	[illegible]	Covered area in Kharif
			Field day	[illegible]
2	Anuppur	[illegible]	[illegible]	
3	Sheo	[illegible]	[illegible]	
			Field day	Covered area in Rabi
4	Sidhare	[illegible]	[illegible]	[illegible]
			Field day	Field days - [illegible]
5	Harmani	[illegible]	[illegible]	
			Field day	
6	Indore	[illegible]	[illegible]	
			Field day	
7	Rajgarh	[illegible]	[illegible]	
			Field day	
8	Hoshi		[illegible]	
			Field day	
9	Shahjahpur		[illegible]	
			Field day	
10	Jaipur		[illegible]	
11	Kahem		[illegible]	
			Field day	
Total		Kharif - [illegible] acres	Field Days - 9 No. Rabi - [illegible] Acres	Field Days - 9 No.

- **Workplan for 2008**
  - Summer workout

SN	District	Activity	
		Vermicompost	Kitchen garden
1	Vidisha	[illegible]	[illegible]
2	Raisen	[illegible]	[illegible]
3	Sagar	[illegible]	[illegible]
4	Rajgarh	[illegible]	[illegible]
5	Guna	[illegible]	[illegible]
6	Sehore	[illegible]	[illegible]
7	Shajapur	[illegible]	[illegible]
8	Mandla	[illegible]	[illegible]
9	Indore	[illegible]	[illegible]
10	Barwani	[illegible]	[illegible]
11	Anandpur	[illegible]	[illegible]
12	Jhabua	[illegible]	[illegible]
	Total	[illegible]	[illegible]

- **Kharif Workplan**

SN	District	Planned Activity		
		INM	Intercropping	Sole cropping
1	Vidisha	20	3	4
2	Raisen	47.5	80	0
3	Sagar	74	0	0
4	Rajgarh	20	5	0
5	Guna	12	6	0
6	Sehore	22	0	0
7	Shajahpur	195.75	5	0
8	Mandla	30	10	5
9	Indore	34	0	0
10	Barwani	20	3	2
11	Anandpur	22	3	3
12	Jhabua	22.23	20	4
	Total	519.48	135	18
	Overall total			672.48


ICRISAT
TATA
Thanks

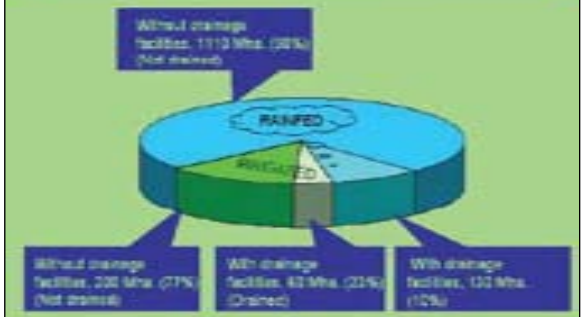
AGRICULTURAL DRAINAGE TECHNOLOGIES FOR ENHANCING THE PRODUCTIVITY OF TEMPORARY WATERLOGGED VERTISOLS

Ramadhar Singh
K.V. Ramana Rao
D.M. Bhandarkar

Definition of Land Drainage

PRE'ELLING	NEW
Land drainage is the removal of excess surface and subsurface water from the land including the removal of soluble salts, to enhance crop growth.	Land and water management through the process of removing excess surface water and managing shallow water tables- by retaining and removing water- to achieve an optimal mix of economic and social benefits while safe guarding key economical functions. (The World Bank 2004)

STATE OF DRAINAGE DEVELOPMENT OF THE WORLD'S CROP LAND



Global Drainage Scenario

It is estimated-

- **50% of the world's irrigated lands suffers from drainage problems**
- **25 Mha of prime agril. land have become unproductive due to irrigation-induced waterlogging and salinity**
- **250 Mha of rainfed crop land needs improved drainage**
- **190 Mha are provided with drainage infrastructure**

NATIONAL SCENARIO

DIVERSE CRITERIA OF WATERLOGGING

Water depth	WDMR-1991 (GOI)	Haryana	Punjab
0.0 - 1.5 m		Chronically waterlogged	Very critical
0.0 - 2.0 m	Waterlogged		Critical
1.5 - 3.0 m		Moderately waterlogged	
2.0 - 3.0 m	Potentially waterlogged		
> 3.0 m	Not waterlogged		

Kinds of waterlogged areas in India

India has a wide range of climatic and physiographic conditions

(1) Rainfall induced waterlogging: In inadequately drained lands during the monsoon period.

(2) Irrigation induced waterlogging and salinity: Application of irrigation water in excess of crop needs.

(3) Natural salinity: Prevails at various locations in the semi-arid parts of north- west and central India

Water Table Rise in Irrigation Commands

Irrigation Command	Rise of water table (m/year)
MRBC, Gujarat	0.28
IGNP, Rajasthan	0.29 - 0.88
W J B C C, Haryana	0.30 - 1.00
S C C , Punjab	0.10 - 1.00
S S C C, U.P.	0.68
M C C ,Karnataka	0.6 - 1.20
N S I P, A.P.	0.32
S. S .I. Project, A. P.	0.26

State wise Waterlogged and Salt Affected Areas (Million hectares)

State	Waterlogged area Mha	Salt affected area Mha
Andhra Pradesh	0.596	0.613
Bihar	0.353	0.400
Gujrat	0.484	0.489
Haryana	0.275	0.455
Karnataka	0.036	0.404
Kerala	0.012	0.035
Madhya Pradesh	0.057	0.342
Maharashtra	0.511	0.634
Orissa	0.196	0.402
Punjab	0.199	0.883
Rajasthan	0.248	1.122
Tamilnadu	0.178	0.343
Uttar Pradesh & Uttaranchal	1.880	1.255
Total	4.528	7.005

Source : Ghosh, 1991 and Tyagi 1999.

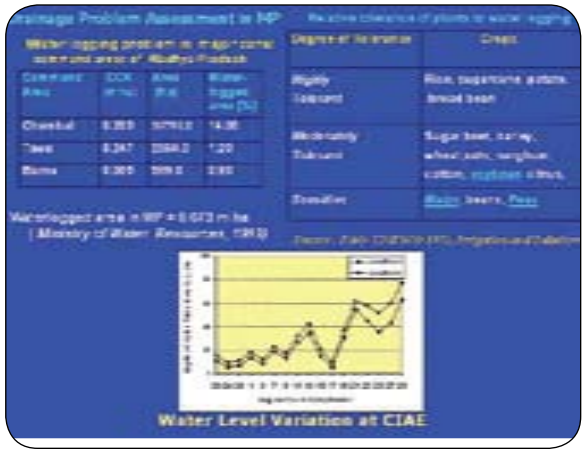
Heavy Clayey Soils (*Vertisols*)

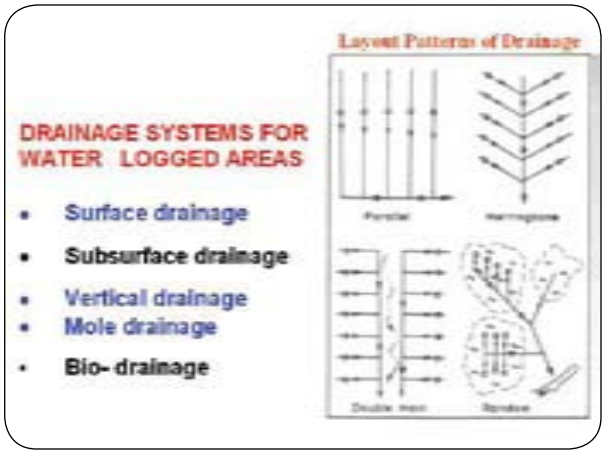
Global land area : 320 mha (2.5%)
About 83% Area : Semiarid and arid conditions

In India, 75 mha land is under vertisols.

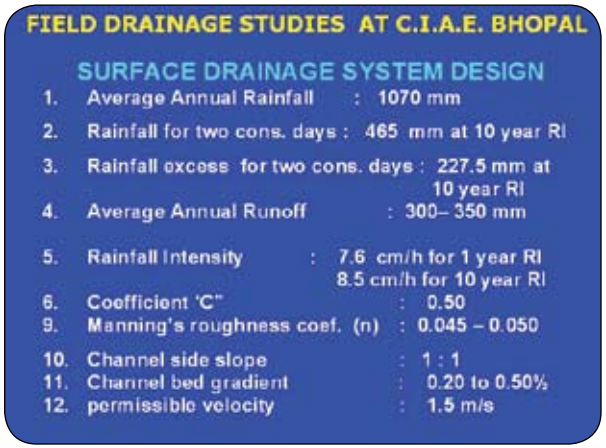
Vertisols suffer from surface ponding and/or waterlogging due to poor soil physical parameters.Vertisols offer good prospects of production when adequately drained

One of the most important challenges in agril. water management is the drainage of clay soils.


Water Level Variation at CIAE


DRAINAGE SYSTEMS FOR WATER LOGGED AREAS
Surface drainage
Subsurface drainage
Vertical drainage
Mole drainage
Bio- drainage
Layout Patterns of Drainage


Equipment and Machinery for Land Drainage
Trenchless Plough with Laser Beam Grade Control System


FIELD DRAINAGE STUDIES AT C.I.A.E. BHOPAL
SURFACE DRAINAGE SYSTEM DESIGN
1. Average Annual Rainfall : 1070 mm
2. Rainfall for two cons. days : 465 mm at 10 year RI
3. Rainfall excess for two cons. days : 227.5 mm at 10 year RI
4. Average Annual Runoff : 300– 350 mm
5. Rainfall Intensity : 7.6 cm/h for 1 year RI
8.5 cm/h for 10 year RI
6. Coefficient 'C' : 0.50
9. Manning's roughness coef. (n) : 0.045 – 0.050
10. Channel side slope : 1 : 1
11. Channel bed gradient : 0.20 to 0.50%
12. permissible velocity : 1.5 m/s

Field experiment on Surface Drainage

Crop/ variety : Maize, *(Vijay Composite)*
Drain spacing : 20 m
Plot sizes : Drain spacing(m) x 65m m
Nutrients application : Recommended doses of NPK @ 150,50, & 30 kg/ha
Cultivation practices : Standard recommended cultivation practices mechanized farming

Field experiment on Surface Drainage

Crop/ variety : Pigeon Pea*(Vijay)*
Drain spacing : 10 m, 15m 20m
Plot sizes : Drain spacing(m) x 65 m
Nutrients application : Standard Recommended dozes of NPK
Cultivation practices : Standard recommended cultivation practices of mechanized farming

Field Experiment on Sub-Surface Drainage (SSD) System

(Kharif-2005 - 2007)

SSD System : Installed in June 2005 in R-3 Field with automated water pumping and measuring system from drainage outlet

SSD Pipe : Corrugated Perforated PVC pipes 75 mm /80mm dia

Filter Envelop : Geo textile Filter

Drain spacing (m) : 20 m

Drain depth (m) : 1.0 m

Drain slope : 0.2 Per cent

Crop /Variety : Maize (Vijay Composite)

DRAINAGE FILTER MATERIAL SELECTION

Sedimentation in Lateral Drains

Filter Material	Sediment Deposited (g/m)
Gravel	340
Geotextile	122
Plastic Netting	209
Coir	954
Without Filter	4200

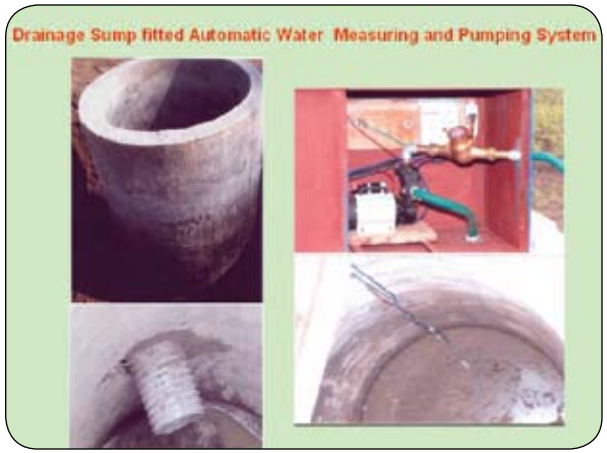
Entrance Resistance of envelope materials in Heavy Textured Soils

Envelope Materials	Entrance Resistance (days/m)	Performance
Gravel	1.44	Moderate
Geotextile (900)	2.02	Moderate
Netting cloth	4.17	Poor
Coir	2.09	Moderate

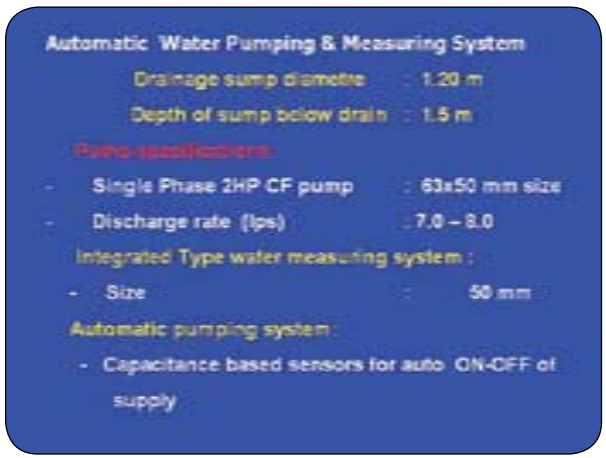
Source: Drainage Manual No. 10, CSSRI, Karnal

The geo-textile envelop filter material - selected for the drainage experiment

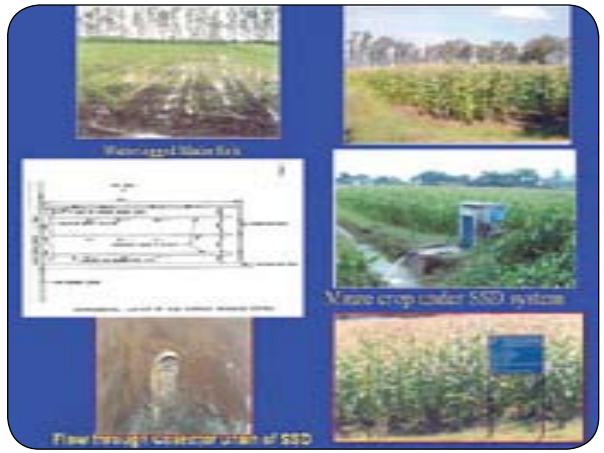

INSTALLATION OF SSD SYSTEMS
Laying of SSD in Trench
Backfilling after SSD Installation


Drainage Sump fitted Automatic Water Measuring and Pumping System


Drainage Pipe Specifications
•Perforated corrugated PVC Pipe
•Standard as per ASTM F- 800
•Perforated area : 2 - 3 % Pipe area
OR
•Inflow area : 1200 - 1800 mm²
•Perforations : 100/m length
* Slot size
Width : 0.8 – 2.0 mm
Length : 8 – 15 mm
Geotextile Filter Material Specifications
•Type : SAPP 240
•Thickness : 2 - 4 mm
* Filtration openings : 110 microns
* Mass : 225 g/m²


Automatic Water Pumping & Measuring System
Drainage sump diameter : 1.20 m
Depth of sump below drain : 1.5 m
Pump specifications:
- Single Phase 2HP CF pump : 63x50 mm size
- Discharge rate (lps) : 7.0 – 8.0
Integrated Type water measuring system :
- Size : 50 mm
Automatic pumping system :
- Capacitance based sensors for auto ON-OFF of supply


Temporary Water logged Condition fo - Soybean
Automatic Pumping & Measuring System
Crop Condition with Drainage Systems
Discharge through SS drain


Maize crop under SSD system


Exp. Maize crop Under SSDs & SUMP with Automatic Water Pumping & measuring systems


CONTROL
Pigeon Pea Crop in Sub- Surface Drained Field

Economics of Geo-Textile Fabric Envelope Use in SSD System

Cost of SSD with envelope (Geotextile fabric)	= Rs. 64853/-
Cost of SSD with out envelope	= Rs. 52978/-
Additional cost of envelope use in SSD	= Rs. 11875/-
Maize yield under SSD with envelope	= 5.8 t/ha
Maize yield under SSD without envelope	= 4.35 t/ha
Wheat yield under SSD with envelope	= 4.86 t/ha
Wheat yield under SSD without envelope	= 4.78 t/ha
Additional Net Annual Benefit in SSD with envelope	= Rs. 4043 /year
Payback period for use of envelope in SSD system	= 2.97 say 3 year

Pigeon pea and Maize yield under SSD systems

Drainage systems at 20 m drain spacing	% Increase over control		
	Maize	Pigeon Pea	Soybean
Surface drainage (SD)	21.5	20.7	40.0
Combined SSD and SD	59.5	64.2	66.8
SSD (Chimney with filter)	54.8	59.1	-
SSD (with filter)	40.0	40.9	54.2
SSD (without filter)	33.4	39.1	-
Control	-	-	-

Summary of Benefit Cost Analysis

Cultivation Practice	Soybean B/C Ratio	Maize B/C Ratio	Pigeon Pea B/C Ratio
[illegible]	1.77	1.34	1.53
[illegible]	1.36	1.44	1.55
[illegible]		1.53	1.79
[illegible]		1.43	1.63
[illegible]		1.36	1.59
[illegible]	1.63	1.56	1.87
[illegible]	1.44	1.42	1.67

EFFECT OF SUB-SURFACE DRAINAGE ON SEQUENTIAL CROP

[illegible]	[illegible] Variety	[illegible] Yield (t/ha)		% increase over Control
		SSD field	Control	
Rabi-2005-06	Wheat (HI-8498)	5.50	4.92	11.78

EFFECT OF SUB-SURFACE DRAINAGE ON SEQUENTIAL CROP

			SSD Field	Control	
Rabi-2006-07	Chick Pea (Vijay)		1.864	1.735	13.20
Rabi-2007-08	Chick Pea (JG-11)		1.940	1.338	44.91

Transfer of Drainage Technology at Farmers' Field

FARMERS' VISIT TO DRAINAGE STUDY EXPERIMENTAL FIELD

Surface Drains Making at Farmer's Field in the Village Khajuri

Major Constrains : Large scale adoption of SSD needs:

- A grid of surface drains in waterlogged areas to provide outlets for drainage systems.
- A policy decision on inclusion of drainage as component in on going watershed devel. programmes.
- Requirement of heavy machinery for large scale SSD adoption.
- The development and production of drainage machines and materials are based on demand. The production capacity of the drainage materials is to be enhanced
- Continuous flow of funds needed for surface drain maintenance. Financial assistance to resource poor farmers, as SSD requires high initial investment .
- The people's participation through community development programme.

CONCLUSIONS

Open drainage channels at 15 to 20 m interval and 0.5 m deep with side slopes of 1: 1 and bed gradient less than 0.5% were found to be effective for providing enough relief to crop root zone for soybean crop.

SSD Coefficient was found to be 5.10 to 5.34 mm/day. The SSD system with 20 m drain spacing and 1.0m drainage depth using corrugated perforated PVC pipe of 72/80 mm diameter covered with geo-textile filter is required for effective drainage.

Surface drainage system resulted in 25-48% increase in yield over control and the SSD system resulted in 40-64 % increase over control for soybean, maize and pigeon pea crops.

SSD also resulted in 12 - 15% increase in yield of subsequent rabi season wheat and chickpea crops over the control.

CONCLUSIONS Contd.....

The cost of making surface drains may vary between Rs. 1250 – 1500 /ha depending upon the field orientation and drain layout. The total cost of SSD systems is fund to be Rs. 65,000/ha due to closer drain spacing in vertisols. The cost of mole drainage at 4 m mole spacing varies Rs. 2000 - 2500/ha

The drainage technologies are found to be techno-economical feasible for temporary waterlogged vertisols.

The payback period for sub surface (pipe) drainage systems for crops sensitive to waterlogging is 5-7 years.

RECOMMENDATIONS

- The surface and sub surface drainage technologies are techno-economical feasible for soybean , maize & pigeon pea crops cultivation in temporarily waterlogged vertisols of Bhopal region.
- Under high water table condition, when natural outlet is available near the field, the combination of surface and sub surface drainage is recommended for draining vertisols effectively.
- For extensive adoption of this technology, drainage grid is necessary and it may be created with farmers' participation in collaborative programmes of the State Governments.
- Awareness about the benefits of the drainage technology in the farmers need to be brought through demonstration and training programs.

MOLE DRAINAGE TECHNOLOGY

By

Dr. KV Ramana Rao

Making of Mole Drain

Mole Plough

Soybean in mole drained Field

Multiple Impacts of Drainage

- Increased agricultural production and productivity
- Positive impact on public health, drinking water supply and sanitation
- Less damage to buildings and other rural infrastructure, increases the value of the land
- Negative impacts on environmental functions

(Disposal of drained water, dumping of untreated domestic and industrial wastewater and other pollutants into open drains)

SELECTION CRITERIA FOR DRAINAGE SYSTEMS

Surface drainage systems **are usually applied in relatively flat lands that have soils with a low or medium infiltration capacity, or in lands with high-intensity rainfalls and frequent water logging occurs on the soil surface.**

Sub surface drainage (SSD) systems are used when the drainage problem is mainly that of shallow water tables or temporarily built shallow water tables.

When both surface and subsurface water logging occur, a combined surface and SSD system is required.

The choice between a SSD system by pipes, pipeless and ditches or by tube wells is more a matter of technical criteria and costs than of agricultural criteria.

Usually, pipe drains or ditches are preferable to wells. In absence of the main drainage systems or natural outlets, the installation of drainage systems is not recommended.

Quality of Sub Surface Drained Water

Water quality parameters	Kharif 2006		Rabi 2006		Water Quality Standards	
	Avg. 2006	Ext. 2006	Avg. 2006	Ext. 2006	BIS	WHO
Nitrate			127	53.4		
Phosphate			0.63	0.04		
Potassium			9.95	1.23		
Ph			8.4	7.8		
EC (dS/m)			1.1	0.6		
TDS			174	158		
Fluoride			0.22	0.19		
T. Hardness			241	214		
Total Iron			0.32	0.16		
Sodium			30	27		
Magnesium			28.1	26.4	-	-
Carbonates			102	102	-	-
Calcium			68.9	64.2	-	-
Ammonium Nitrate			0.11	Negligible	-	-

All values are mg/litre except pH and EC

Strengthening Collaboration between IISS and Tata-ICRISAT-ICAR Projects

Scientific Interventions In Management of Vertisols for Enhanced Crop Productivity and Input Use Efficiency – IISS Experiences

Dr. A. SUBBA RAO
Director

Indian Institute of Soil Science, Bhopal

VERTISOLS (Traditional Black Soils)

- The Vertisols and associated soils occupy 73 million hectares (22.5% of total geographical area) in sub-humid and semi-arid tropics of India.

Soil Physical Constraints

- Soil water deficits and excesses occur back to back
- Narrow workable range of soil moisture
- Poor permeability, low infiltration rate, hard-setting etc.
- Vulnerable to runoff and soil erosion losses
- High energy input requirement for tillage operations

Conservation tillage for soybean-wheat system

Conservation tillage practices *viz.*, No-tillage (with crop residues retained on the surface and direct drilling of seed) and Reduced tillage (residue retained + 1 sweep tillage) were as effective as conventional tillage (residue removed + 1 summer tillage by sweep cultivator + 2 tillage by sweep cultivator) in terms of crop productivity under soybean and wheat

Suitable land configuration for rainfed Vertisols

- Broad-bed and furrow (BBF) (1 m wide broad bed and 0.3 m furrow on 0.4-0.6 % slope) was found superior to flat-on grade (FOG) system of land configuration interms of increased yields of soybean, maize and pigeon pea (11-18%), and decreased runoff and sediment losses.

Enhanced water use efficiency under limited water supply

- Synergistic interactions between water and nutrient were exploited to promote water and nutrient use efficiency of Indian mustard and wheat crops.
- Wheat yield obtained with three irrigations at CRI, active tillering and flowering stages along with recommended NPK (100: 21.5: 24.9 kg ha-1) has not been different significantly from application of two irrigations at CRI and flowering stages along with recommended NPK + FYM (applied to preceding soybean).
- Results imply that conjunctive use of recommended NPK and 10 t FYM ha^{-1} lead to a net saving of one irrigation in Rabi crops and enhanced water use efficiency.

Best soil moisture conservation practice to support post-rainy season chickpea

- Soil moisture conservation practice of late interculture + *Cliricidia* cover in the inter-row spaces of standing maize (@ 5 t/ha fresh weight basis) + maize stover application (after sowing up to germination) improved the productivity of chickpea (932 kg/ha) grown in the post rainy season. The accrued benefit was primarily due to increased conserved soil moisture and less water-stress for chick pea.
- Thus, the practice is very useful in rainfed areas where even a single irrigation is not available for the rabi crops.

Soil Fertility Constraints

- Poor native fertility (low in SOC and available N, low to medium in available P, S and Zn, while the Fe, B deficiencies are on rise)
- Use efficiency of applied nutrients is low, particularly of P

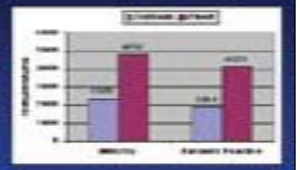
IPNS for Soybean-Wheat system on Vertisols

- The IISS developed an Integrate Plant Nutrient Supply Technology for enhancing and sustaining productivity and soil health under soybean-wheat system in Malwa region. The technology has got the flexibility of using different proportions of fertilizer and FYM depending on the farmyard manure (FYM) availability with the farmer.
- For a yield target of 2 t soybean and 3.5 t wheat per ha, the IPNS variants are:

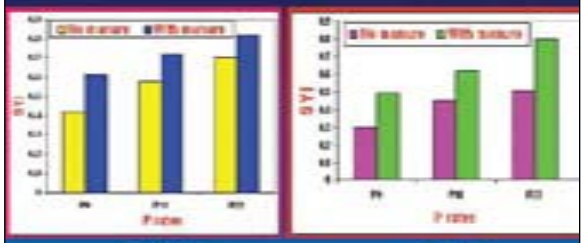
FYM (t ha^{-1})	Fertilizer Nutrient (kg ha^{-1})							
	Soybean				Wheat			
	N	P	S	Zn	N	P	S	Zn
0	35	39	40	12	140	40	40	0
4	20	24	20	6	110	32	20	0
8	10	10	0	0	80	20	0	0
16	0	0	0	0	60	10	0	0

Low-cost Integrated Nutrient Management (INM) Technology for Soybean-Wheat System

The INM module comprising "50% NPK + 5 t FYM /ha + Rhizobium to soybean and 75%NPK+PSB to wheat" produced 11% higher soybean yield and 25% higher wheat yield as compared to Farmers' practice.



Impact of FYM and Fertilizer P on Production Sustainability under Soybean-wheat System



Residual P Management of Vertisols under Soybean-wheat System

- Fertilizer-P applied to soybean showed residual effects in two succeeding crops while the P applied to wheat had a significant residual effect on only one succeeding crop.
- The P applied to soybean was more efficiently utilized than that applied to wheat in the system.
- Fertilizer P applied to soybean at the rate of 39 kg ha^{-1} was adequate enough to meet the entire P requirement of soybean and 80% of the P required for the following wheat

Soil test maintenance P requirement of Vertisols

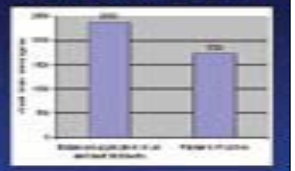
- A phosphorus fertilization technology for soil-test maintenance and optimum crop yields under soybean-wheat system on Vertisol was developed.
- P input rate for soil test maintenance was equal to crop P removal if P was supplied through manure + fertilizer (1:1 P basis) and 48% higher than the crop P removal when P was supplied as fertilizer alone.

P supply strategy (PSS)	Soil test maintenance P requirement (STMPR) of soybean-wheat rotation (kg ha^{-1} yr^{-1})	Yield levels of rotational crops at STMPR (Mg ha^{-1}) Soybean	Wheat	Total P removal at STMPR (kg ha^{-1} yr^{-1})	STMPR to P removal ratio
PSS-I	36.1 (22.2 + 13.9)[a]	1.91	4.10	25.2	1.4
PSS-II	26.3 (16.2 + 10.1)	1.86	4.05	23.4	1.1
PSS-III	24.1 (14.8 + 9.3)	1.90	4.01	23.7	1.0

PSS-I Inorganic P; PSS-II Organic P; and PSS-III = Inorganic and Organic P (1:1)

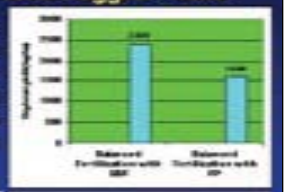
Balanced Nutrient Management in Soybean

- Balanced application of all deficient nutrients [NPKSZn] at recommended rates improved the soybean yield by 37% over the Farmers' Practice (BF at lower rates)



Balanced Fertilization with Broad Bed Furrow (BBF) in Soybean on Waterlogged Fields

On waterlogged fields, planting soybean with balanced fertilization on BBF produced 50% higher yield than balanced fertilization with Farmers' Practice of land configuration.



MECHANICAL HARVEST-BORNE WHEAT RESIDUE MANAGEMENT UNDER SOYBEAN-WHEAT SYSTEM

- Wheat residue incorporation or retention coupled with application of 28 kg N ha^{-1} through fertilizer or organic manures is more beneficial than burning in terms of enhanced crop productivity and soil fertility.
- Wheat residue incorporation resulted in 20–22% higher yields in soybean and 15-25% in wheat as compared to residue burning.

- Soil incorporation of wheat residue plus N supplementation through FYM at the rate of 28 kg N ha^{-1} (approx. 4 t FYM ha^{-1}) along with 25 kg P ha^{-1} for rainfed soybean and 68 kg N + 30 kg P ha^{-1} for irrigated (1+ 2 irrigations) wheat was more effective and profitable

Balanced Fertilization Technology for Cotton

- A balanced fertilization technology (BFT) for cotton (80-40-20 kg N-P_2O_5-K_2O ha^{-1} + Zn @ 25 kg $ZnSO_4$ ha^{-1} + B @ 1 kg ha^{-1} as 0.1% B foliar spray twice) was developed under the Technology Mission on Cotton (TMC) and demonstrated on 10 farmers' fields.

- With balanced fertilization the yield gains in cotton ranged from 13 to 41%, with the mean yield increase across all farms being 28%.

Integrated Nutrient Management (INM) for Pulses

- On-farm trails on INM for pulses (chickpea and lentil) conducted at 60 farmers' fields in Raisen, Bhopal, Rewa and Satna districts of Madhya Pradesh not only resulted in higher yields but also saved fertilizer cost.
- Application of 75% NPK + 25t FYM + seed inoculation through Rhizobium + soil application of 3 kg PSB ha^{-1} to the soybean during kharif and 50-75% NPK to rabi crop (chickpea/lentil) (based on residual moisture availability) produced 12-25% more chickpea and 15-28% more lentil yields as compared to traditional practice.

Treatment	Bhopal & Raisen	Rewa & Satna	
	Chickpea	Lentil	Chickpea
INM	1.3 (13.5)	1.1 (20.7)	3.3 (31.9)
INM + Moisture Conservation	2.4 (25.8)	1.3 (28.3)	4.6 (42.7)

Yield advantage in pulses due to improved nutrient management and moisture conservation @ ha^{-1} & %)

WELCOME

SPEAKER

Dr. D.H. RANADE

OPERATIONAL RESEARCH PROJECT

COLLEGE OF AGRICULTURE, INDORE (M.P.)

RAJMATA VIJAYARAJE SCINDIA AGRICULTURAL UNIVERSITY, GWALIOR (M.P.)

O.R.P, COLLEGE OF AGRICULTURE, INDORE

CAMPUS, R.V.S.K.V.V., GWALIOR (M.P.)

ICAR

(ORP)

HINGONIA PIPLIYATAPHA (86 -98)

BAROLI (1999 - 2004)

JAITPURA (2004 -2006)

PANOD – 2007 ONWARD

(Adhoc Projects)

Pipliyahana, Umariya Khurd – Till 2003

Barlai, Panod and Dakachya

Rainfall (mm) at Indore during 2005-08

Period	Normal	2005	2006	2007	2008
April-May (Summer)	13.72	0.0	47.5	46.2	0.0
June-October (Kharif)	927.8	733.0	1086.9	865.8	565.4
November-March (Rabi)	22.25	41.0	1.4	0.0	53.8
Total	963.8	774.0	1135.8	912.0	619.2
Rainy days during monsoon		30	56	37	34

Up scaling and out scaling of technology and Participatory technology demonstration.

To provide technical guidance to farmers for up scaling and out scaling of various technologies of water conservation


KHUDEL 2007
Tank Construction in progress
Technical guidance

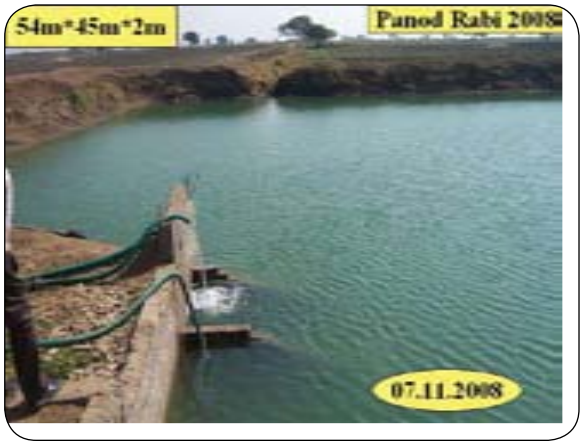

Santosh Choudhary tank
135 m * 70m * 5m
KHUDEL 2007
02/08/2007


Santosh Choudhary tank
Storage capacity – 45000 cu.m
KHUDEL 2008
07.11.2008


Potential sites for Percolation tank
HATOD 2008
15.04.2008

Development of water harvesting tank/sunken tanks and its effect on crop productivity-

To generate data on water availability and to observe its effect on increase in *Rabi* cropped area.



IRRIGATIONS FROM THE TANK (2008-09)		
CROPS	No. of irrigations	
WHEAT	3	4 ha
CHICKPEA	1	2 ha

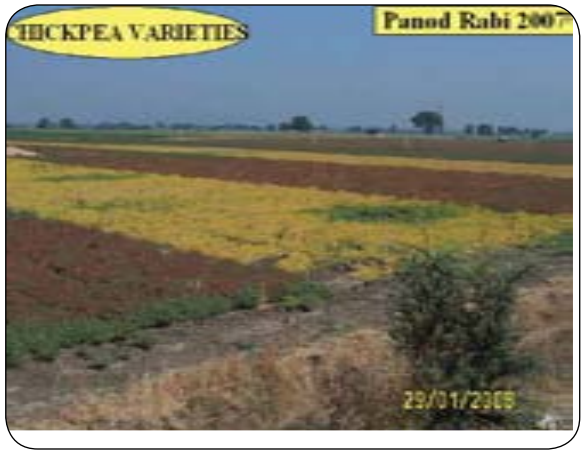
CROP VARIETAL TRIALS


SOYBEAN VARIETIES
Panod 2008
08.07.2008


MAIZE CHANDAN SAFED
Barlai 2008
19.09.2008


SOYBEAN VARIETIES
Panod 2008
05.09.2008


MAIZE JM 216
Barlai 2008
19.09.2008



IMPACT OF CROPPING TECHNOLOGY

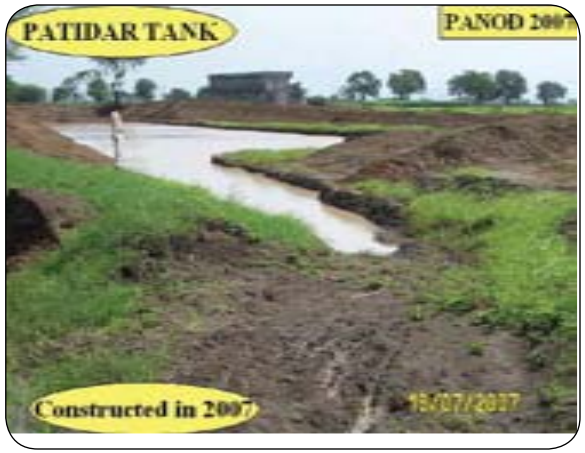
Introduction of varieties (2007-08)

CROPS	Yield (kg/ha)	
	Local	Improved
SOYBEAN	1750	JS 9560 2140- 2260
CHICKPEA	916	JG 412 1929

IMPACT OF CROPPING TECHNOLOGY Introduction of varieties (2008-09)		
CROPS	Yield (kg/ha)	
	Local	Improved
SOYBEAN	1683	JS 9305 2200 - 2500
CHICKPEA Rainfed (12-15q)	850	JG 412 1500
ADOPTION	60% (SOYBEAN)	
ADOPTION	50% (GRAM)	

INCREASE IN AREA (HA) UNDER IMPROVED VARIETIES OF DIFFERENT CROPS IN PANOD VILLAGE			
CROP	2006	2007	2008
GRAM (50% under improved variety in 2008)			
VISHAL	-	200 kg (2.5 ha)	120 kg (1.5 ha)
JG 412	-	120 kg (1.5 ha)	120 kg (1.5 ha)
JG 130	-	-	120 kg (1.5 ha)
KAK 2	-	120 kg (1.5 ha)	120 kg (1.5 ha)
JGK 2	-	120 kg (1.5 ha)	120 kg (1.5 ha)
SAFFLOWER			
JSI 73	-	-	24 kg (1.0 ha)

PLANTATION ACTIVITIES


PATIDAR TANK
PANOD 2007
Constructed in 2007


GLIRICIDIA ON TANK BUNDS
PANOD 2007


GLIRICIDIA ON TANK BUNDS
PANOD 2008
Planted in 2007
12.12.2008


MEHANDI FOR BUND PROTECTION
PANOD 2008
Planted in 2007
05.12.2008

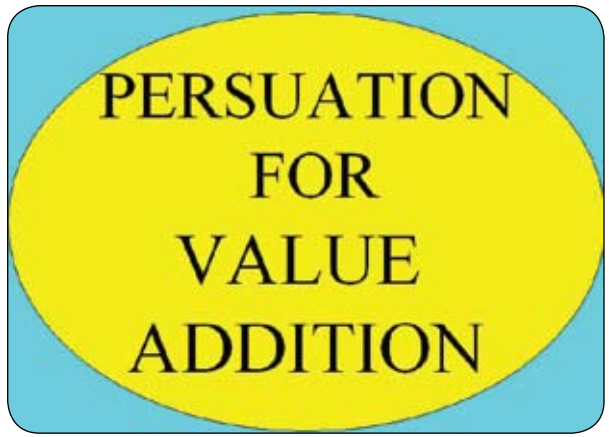

AONLA ON TANK BUNDS
DAKACHIYA 2008
Planted in 2005
11.08.2008

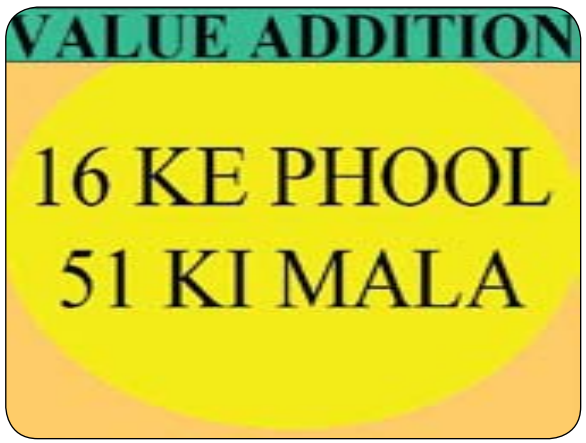

TANKS UNDER
TECHNICAL
GUIDANCE


Patidar tank under technical guidance
PANOD 2007
Constructed in 2007
23/06/2007


Tank for borewell recharge
PANOD 2008
Constructed in 2007
12.12.2008


Tank for borewell recharge
PANOD 2009
13.02.2009


PERSUATION
FOR
VALUE
ADDITION


VALUE ADDITION
16 KE PHOOL
51 KI MALA


PANOD 2008
12.12.2008

NUMBER OF SEPARATORS PURCHASED IN 2008 IN PANOD	
WITH FIVE SPIRALS	TWO NOS. (5000/-EACH)
WITH SEVEN SPIRALS	THREE NOS. (5500/- EACH)


PASSION FRUIT
BARLAI 2007
05/11/2007


BARLAI 2007


Storage cum recharge tank
BAROLI 2006

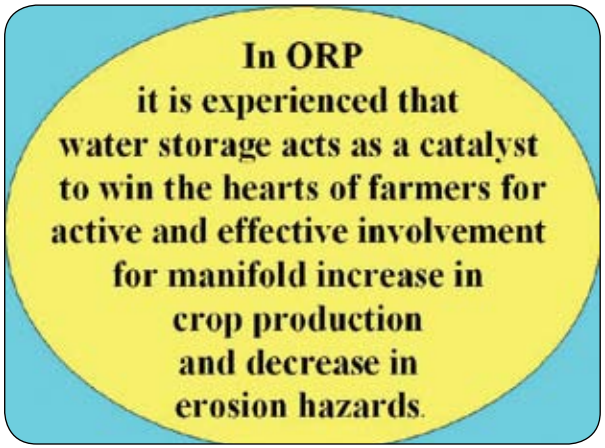

Storage cum recharge tank
BAROLI 2006
11/08/2006

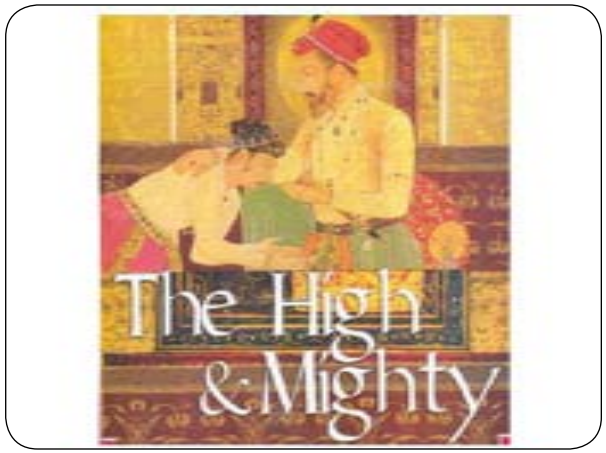

बारोली में बिन बारिश मौज

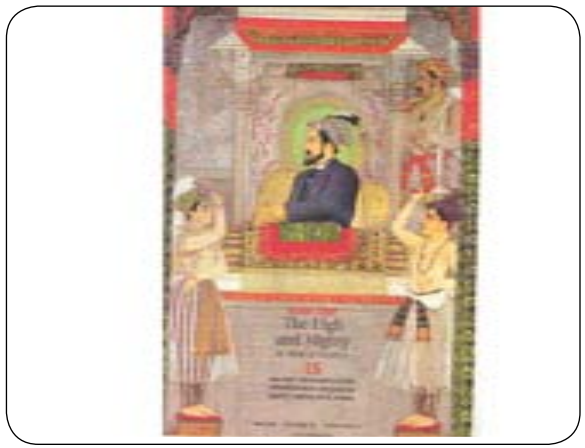

Under designed outlet
BAROLI 2006
11/08/2005


इंदौर एक्सप्रेस
एक्सीलेटर कॉलेज ने
संवार दिया क्षेत्र को


खेती


In ORP
it is experienced that
water storage acts as a catalyst
to win the hearts of farmers for
active and effective involvement
for manifold increase in
crop production
and decrease in
erosion hazards.


The High
& Mighty




THANK
YOU
29/01/2008

Baseline Survey – Timeline to Submit Final Report

Soil Fertility Enhancement

- *Gliricidia* planting
- Tank silt application
- Vermicomposting Phosphocompost


Enhancing Water Use and Management

- BBF
- Contour cultivation
- Low cost drip irrigation
- R&F


Crop Intensification

- Rainy season fallow management
- Rice-fallows
- High-value crops
- Crop diversification


Increasing Productivity

- Improved cultivars
- Village seed banks
- Micronutrient amendments → Soil, Foliar
- Soil test-based fertilizer application
- IPM
- Weed management

Income-generating Activities

- Nurseries
- Village seed banks
- Poultry and goat rearing

Training and Technology

- Exposure visits
- Environment clubs
- Field Days

Monitoring and Evaluation

- Data collection
- Report writing
- Reporting
- Documentation – photos and videos

Work Planning

Two Groups

- SDTT - KL Sahrawat
- SRTT - Suhas P Wani

About ICRISAT

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that does innovative agricultural research and capacity building for sustainable development with a wide array of partners across the globe. ICRISAT's mission is to help empower 600 million poor people to overcome hunger, poverty and a degraded environment in the dry tropics through better agriculture. ICRISAT is supported by the Consultative Group on International Agricultural Research (CGIAR).

Contact Information

ICRISAT-Patancheru (Headquarters)
Patancheru 502 324
Andhra Pradesh, India
Tel +91 40 30713071
Fax +91 40 30713074
icrisat@cgiar.org

ICRISAT-Liaison Office
CG Centers Block
NASC Complex
Dev Prakash Shastri Marg
New Delhi 110 012, India
Tel +91 11 32472306 to 08
Fax +91 11 25841294

ICRISAT-Nairobi (Regional hub ESA)
PO Box 39063, Nairobi, Kenya
Tel +254 20 7224550
Fax +254 20 7224001
icrisat-nairobi@cgiar.org

ICRISAT-Niamey (Regional hub WCA)
BP 12404, Niamey, Niger (Via Paris)
Tel +227 20722529, 20722725
Fax +227 20734329
icrisatsc@cgiar.org

ICRISAT-Bamako
BP 320
Bamako, Mali
Tel +223 20 223375
Fax +223 20 228683
icrisat-w-mali@cgiar.org

ICRISAT-Bulawayo
Matopos Research Station
PO Box 776,
Bulawayo, Zimbabwe
Tel +263 83 8311 to 15
Fax +263 83 8253, 8307
icrisatzw@cgiar.org

ICRISAT-Lilongwe
Chitedze Agricultural Research Station
PO Box 1096
Lilongwe, Malawi
Tel +265 1 707297, 071, 067, 057
Fax +265 1 707298
icrisat-malawi@cgiar.org

ICRISAT-Maputo
c/o IIAM, Av. das FPLM No 2698
Caixa Postal 1906
Maputo, Mozambique
Tel +258 21 461657
Fax +258 21 461581
icrisatmoz@panintra.com

www.icrisat.org

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