Proceedings of

GoK-CGIAR Initiative for Improving Rural Livelihoods in Karnataka

3–4 January 2013
Samrudhi Hall, Department of Agriculture,
Sheshadri Road, Bengaluru

ICRISAT
Science with a human face
International Crops Research Institute for the Semi-Arid Tropics
Patancheru 502 324, Andhra Pradesh, India

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Day 1: 3rd January, 2013

The GoK-CGIAR initiative on improving rural livelihoods in Karnataka is first of its kind in the country designed to improve the living standard of rural population and is based on the holistic science-led development. With signing of MoU with Government of Karnataka on 6 June 2012. ICRISAT-led CGIAR consortium committed to provide technical backstopping with relevant line departments in the state. With this backdrop, two days planning workshop was organized at Department of Agriculture, Bengaluru to kick-start the project in designated four revenue divisions (Mysore, Bangalore, Belgaum and Gulbarga) in four districts (Chikmagaluru, Tumkur, Bijapur and Raichur) of Karnataka. The workshop was organized during 3-4 January 2013 to discuss the action oriented research in partnership with line departments with specific objectives to increase crop yields by 20% and farmers' incomes by 25% in four years through establishing four sites of learning, scaling-up approach, integrating participatory research for development to benefit small and marginal farmers in irrigated and rainfed agriculture areas in the state.

The meeting was attended by the dignitaries from government of Karnataka specially, Mr Kaushik Mukherjee, IAS (Additional Chief Secretary & Development Commissioner), Mr Bharatlal Meena, IAS (Principal Secretary-Agriculture), Mr V Chandrasekhar, IAS (Commissioner of Agriculture), Dr KV Raju (Economic Advisor to Hon'ble Chief Minister of Karnataka), Dr SA Patil (Chairman, Karnataka Krishi Mission), Dr Sarvesh (Director of Agriculture), Development Commissioners and Chief Executive Officers of Zhilla Parishats of four pilot project districts, and Additional Directors of Agriculture, JDAs, Joint Directors of line departments like Horticulture, Watershed Development Department, Sericulture, University of Agricultural Sciences (UAS) senior scientists. Consultative Group on International Agricultural Research (CGIAR) institutions led by Dr SP Wani ICRISAT with other senior scientists viz. Drs Amare Haileslassie (ILRI/ICRISAT) and Ramana Reddy (ILRI), Dr Sanjay Tomar (ICRAF), Drs Avinash Kishore (IFPRI) and G Senthil Kumar (IFPRI), Dr JK Ladha (IRRI), Dr ML Jat (CIMMYT), Dr Ramakrishna Nair (AVRDC), Drs Duraiswamy and Krishna Reddy (IWMI) and team of ICRISAT scientists were present.

During the Inaugural Session, Dr Sarvesh welcomed the participants and oriented participants about the background of the initiative. Dr Suhas P Wani briefed the gathering about the overview, genesis of the workshop and objectives for this noble platform to increase production by 20% and incomes by 25% over the next 4 years. He highlighted the constraints for improving livelihoods in these four districts which were gathered by the consortium team during earlier field visit to these districts. He stressed on the collective participation in the project implementation and highlighted the Bhoochetana programme which achieved convergence of good practices, different schemes and showcased collective efforts from DoA staff. Dr SA Patil advised researchers to evolve technologies to improve regular income of rural population through participatory research for development He advised to prioritize the constraints to assure regular income flow to farmers on monthly basis. He gave an idea as to how to prioritize activities which are useful for earning regular income. In his opinion, there should be a shift for opportunities like value addition, agribusiness activities and need to be considered with immediate attention. He also emphasized on the public private partnership through convergence of programmes/schemes. In the wake of varying climate risks, he advised on the development of climate resilient crops. In fact, he stressed on adopting soil and water conservation technologies for ensuring crop yield and reducing environmental risks. In his, presidential address, Mr Kasuhik Mukharjee urged to focus on paradigm shift to adopt technologies and mechanism for operationalization. Mr Bhartalal Meena emphasized on bringing in synergy among the activities of different line department to achieve for the desired impact. He further opined that this partnership involves administrative machinery at the top engaging with different departments and scientists from National Agricultural Research System (NARS) and international organizations will be useful mix of knowledge for strengthening rural livelihoods. He said that the real challenge lies in the scaling up and transformation of technologies and experiences. Dr KV Raju urged for a meticulous planning with definite outcome by applying high science tools like mapping of resources and their developments with different thematic layer GIS mapping. He opined that this initiative will be a success with the cooperation from district administrators. He outlined the road map for upscaling the project activities to entire state in a phased manner like Bhoochetana. He appreciated the support from Hon'ble Chief Minister, Chief Secretary, Additional Chief Secretary & Development Commissioner and all department officials and also sought support from CG centers. Dr Raju ensured the GoK' s full support for this noble initiative.

During the technical session on 1st day, district-wise presentation on the constraints was made by Dr. ML Jat, CYMMIT. Based on the field visit observations, he listed out the constraints in Tumkur district viz., socio-economic, technological and institutional aspects etc. There was a discussion followed by his presentation, in which different district level officers, scientists and NGO representatives endorsed the identified constraints and also added to the existing list along with suggesting solutions based on their experiences. These constraints have varying dimension and cutting across different sectors. The initial presentation and participants identified important constraints as under;

- Poor soil fertility.
- Uncertain and low rainfall.
- Lack of knowledge among farmers.
- Labor scarcity.
- Low coconut and other crop yield.
- Pest problems in groundnut/coconut.
- Fodder scarcity.
- Large extent of fallow lands.

Dr Wani suggested all participants to divide into 4 groups and deliberate on different important activities in Tumkur district like – (1) Watershed management and rainfed agriculture, (2) Irrigated agriculture, (3) Livelihood Opportunities, and (4) Institutions, policies and infrastructure.

The Group-1 on "Watershed Management and Rainfed Agriculture" after long deliberations suggested thru their presentation;

- Baseline study to see the ongoing watershed activities and fill in the gaps
- To rejuvenate the existing water bodies by desiltation and reviving feeder canals.
- Application of nutrient and carbon rich tank silt to farm fields
- Integrated watershed management targeted at *in-situ* and runoff water harvesting thru low-cost effective methods like nullah plugging, mulching, check dams, farm ponds, recharge pits etc in the target sites were suggested as effective water management strategy to take care of low and erratic rainfall in the districts.
- Low cropping intensity to be addressed through suggested intercropping with greengram, horsegram, chickpea in coconut plantations.

- Short duration varieties of groundnut and fingermillet were suggested to cope with delayed rains and late crop sowing. Castor, horsegram, red gram were suggested as next best alternative crops to groundnut in low and very late rainfall scenario. Integrated nutrient management (INM) in groundnut and coconut was suggested to take on priority to take care of existing pest problems like mites, black hairy caterpillar and rats which are causing significant yield losses currently. Site specific diversification to vegetables was also recommended to improve farm livelihoods.
- Effectively marketing of region specific crop varieties like red tamarind and Chandrahalsu variety to fetch good prices for farmers and improve livelihoods.
- Improved grass (Napier, multicut bajra/jowar) planting on farm bunds and fallow lands (which are quite large in the district), and
- Planting of fodder trees (*Sesbania, Leucaenia, Milia dube*, Drumsticks) on farm boundaries and fallow lands to overcome fodder scarcity. Dryland horticulture (Pomegranate, Gauva, Amla) was recommended for private fallow lands.
- Value addition, coconut and groundnut oil plant processing on community basis were suggested through organized farmers groups
- Good scope exists for coconut rope/mat making and handicrafts to improve farm livelihoods.
- Introduction of hand decorticator and implements to remove coconut shells.

Timelines were also prepared for each activity – soil and water issues (Y1-4); crop issues (Y1-4); fodder and fallows (Y2-4); horticulture (Y2-4); value addition (Y2-4); mechanization (Y1-4) and capacity building (Y1-4). However, Dr Wani suggested to come up with detailed timelines for the year-1 which was taken care of and modified during final district level planning and preparing action points.

Group-2 on "Irrigated Agriculture" identified that Tumkur district primarily has coconut cultivation in irrigated area. Other than this, rice, maize and horticulture and vegetable crops are also grown in irrigated areas. There are more than 2 lakh bore wells but water yields are poor. There is less scope for enhancing irrigation potential, but water productivity could be enhanced. Cropping intensity is very low at 111% and large areas are under fallow. Water scarcity, labor shortage, pest and poor economic returns are the constraints identified by group and need to be addressed. Dr. Jat mentioned that there is plenty of scope for expanding maize cultivation.

- The group pointed out certain potential interventions in the irrigated agriculture in the district.
- Good scope for intercropping in coconut-based system with diverse crops like turmeric, ginger, nutmeg, tapioca, fodder grass, legumes, cocoa, flowers, vegetables, banana. It will increase the total cropping intensity and resource use efficiency.
- In cereal-based system, crop intensification may be increased by taking two crops for example maize-legumes and rice-legumes.
- Short duration suitable crop varieties e.g. mung bean could be grown in kharif followed by suitable crop (e.g. vegetable soybean) during rabi season. It was discussed that conservation agriculture based crop establishment (direct seeded rice, zero tillage etc) could further be taken up in Tumkur irrigated areas.

Moreover, crop varieties suitable as animal fodder need to be promoted. Drip and sprinkler irrigation for coconut/horticultural and high value cropping systems could be promoted for saving fresh water and for enhancing water use efficiency. Landform form treatment and land laveling is an important intervention to improve water use efficiency. Seed-cum-ferti drill and planters for multi crops/zero till planters, power sprayers and other agriculture machinery need to be introduced to support resource use efficiency. Furthermore various agronomic and management interventions, like balance nutrients management, INM, weed management, integrated pest management (IPM), integrated disease management (IDM) has to be implemented for enhancing crop production for maintaining sustainability and resource use efficiency. The group also deliberated on the responsity part during execution of action plan as under;

- Base line characterization: Whole project team
- ICRISAT: Overall coordination specially on behalf of CG centers, technical, capacity building, livelihood options and inputs on ICRISAT mandated crops and rainfed cropping systems
- IRRI: Direct seeding, weed management and good management practices for rice
- IWMI: Water management
- CIMMYT: Conservation agriculture, cropping system optimization, Capacity building on CA, Maize and maize-based system
- AVRDC: short duration legume/vegetables
- ILRI: fodder quality, crop-livestock interactions

- ICRAF: Agroforestry and fodder trees on farm bunds to rehabilitate degraded lands
- KVKs: Technology exchange, training
- SAUs: Providing knowledge/technology support including capacity builiding
- State departments: Overall leadership in the implementation of project, access to inputs and recommendations for the policy change

Group 3 on deliberated on "Livelihood Opportunities" to be explored in the target regions in the district. For existing livelihood options viz, dairy, sheep & goat rearing and sericulture, the gaps were identified and activities were suggested by taking into consideration all the existing schemes with concerned departments - promotion of "mobile artificial insemination units"; "disease diagnostic centre"; fodder development programme on waste and fallow land with reuse of wastewater; stall feeding for sheep, goats and other small ruminants. A strong need was felt for strengthening as well as increasing collection centers for vegetables and milk as well as cold storage facility for boosting these livelihood activities in Tumkur district. Apart from this good scope exists for other income generating activities viz, seed bank, vermicomposting, primary processing and value addition, apiculture, fisheries, feed cakes/blocks, vocational training. Similarly, establishment of custom hiring centre was stressed and realized as essential activity for reducing the labour scarcity and their by cost of cultivation. The emphasis was given for reducing post-harvest losses and establishing value addition and agro processing units under public-private-partnership (PPP) mode with market linkages in order to increase the profitability. For Tumkur district, establishment of desiccated coconut powder unit, coir pith industries for coir boards, virgin oil production firm were some of the interventions identified.

Group 4 on "Institutions, Policies and Infrastructure", deliberated on the possible interventions and institutional arrangements as against to each constraints identified. As lack of knowledge is a big challenge to livelihood improvement in the district.

- Capacity building of farmers and all other stakeholders is first and the foremost required intervention. For increasing resource use efficiency establishing custom hire service centres at GP level, supply of farm machineries at subsidized rates, and encouraging group approach for sharing of labour for field operations was emphasized.
- Enhancing market related capacity of farmers, group felt a need for establishment of rural godown at GP level, cold chain facilities for perishable products, establishing agro

processing units, primary processing centre, facilities for transportation to markets, procurement and providing minimum support price (MSP) and support for other value addition activities.

- Lack of finance is a big challenge for rural smallholders to be tackled it thru timely access to finance with zero interest for SF & MF, community microfinance & strengthening of SHG and direct cash transfer.
- Low crop productivity issues to be addressed through establish biocontrol laboratories for production of bio-control agents as component of INM/IPM.
- Based on Bhuchetana experience, there is a need to put in place and early warning system for pest and disease management to avoid crop losses.
- Convergence of different schemes is essential with formation of Steering/Coordination committees to address day to day issues thru effective monitoring and evaluation.

Day 2: 4th January, 2013

On 2nd day, the four pilot location teams were formed to prepare the broad work plan. The work plan for each of the location included, pilot project location profile, major constraints, possible interventions, prioritizing the activities, roles and responsibilities of partners, time line schedule of work and way forward.

District-wise Group Planning Deliberations and Action Points

Tumkur (see Appendix 1)

Issues (see Appendix 2 & 3) in Tumkur district were discussed elaborately on the day 1 itself, and so the district wise group streamlined action points (also see Appendix 4) as under;

- To rejuvenate the existing water bodies by desiltation and reviving feeder canals (Watershed Department, NGOs).
- Tank silt to be added into adjoining farm fields (Watershed Department, NGOs).
- Integrated watershed management targeted at *in-situ* and runoff water harvesting thru low-cost effective methods like nallah plugging, mulching, check dams, farm ponds, recharge pits etc (Watershed Department, NGOs, ICRISAT).
- Baseline of ongoing watershed activities and fill in the gaps (Watershed Department, NGOs).
- Intercropping with greengram, horsegram, chickpea in coconut plantations (DoA, DoH, SAUs, ICRISAT).

- Short duration varieties of groundnut and fingermillet to be introduced to cope with delayed rains and late crop sowing (DoA, DoH, SAUs, ICRISAT).
- Castor, horsegram, red gram to be promoted as next best alternative crops to groundnut in low and very late rainfall scenario (DoA, DoH, SAUs, ICRISAT).
- Integrated nutrient management (INM) in groundnut and coconut to be taken on priority to take care of existing pest problems like mites, black hairy caterpillar and rats (DoA, DoH, SAUs, ICRISAT).
- Evaluation of edible cacti species as fodder for animals (SAUs, ICARDS)
- To market effectively certain region specific crop varieties like red tamarind and Chandrahalsu variety to fetch good prices (DoH, NGOs, DoFP, SAUs).
- Improved grass (Napier, multicut bajra/jowar) planting on farm bunds and fallow lands (which are quite large in the district), and also planting of fodder trees (Sesbania, Leucenia, Milia dube, Drumsticks) on farm boundaries and fallow lands (DoA, DoAH, DoH, NGOs, SAUs, KVAFSU).
- Dryland horticulture (Pomegranate, Gauva, Amla) for private fallow lands (DoA, DoAH, DoH, NGOs, SAUs, KVAFSU).
- Coconut and groundnut oil plant processing on community basis thru organizing >50 farmers and utilizing current scheme to get 75% incentive for that (DoH, NGOs, DoFP, SAUs).
- Coconut rope/mat making and handicrafts to improve farm livelihoods (DoH, NGOs, DoFP, SAUs).
- To introduce hand decorticator and implements to remove coconut shells (DoA, DoH, SAUs, NGOs, Cooperative Society, DoAH).
- To expand maize cultivation for better water use efficiency (DoA, DoH, NGOs, SAUs, CIMMYT).
- Intercropping in coconut-based system with diverse crops like turmeric, ginger, nutmeg, tapioca, fodder grass, legumes, cocoa, flowers, vegetables, banana (DoA, DoH, NGOs, SAUs, ICRISAT).
- Crop intensification by taking two crops for example maize-legumes and rice-legumes (DoA, DoH, NGOs, SAUs, AVRDC).
- Short duration suitable crop varieties e.g. mung bean could be grown in kharif followed by suitable crop (e.g. vegetable soybean) during rabi season (DoA, DoH, NGOs, SAUs).
- Conservation agriculture (direct seeded rice, zero tillage etc) to be taken up in irrigated areas (DoA, DoH, NGOs, SAUs, CIMMYT).

- Drip and sprinkler irrigation for coconut/horticultural and high value cropping systems (DoA, DoH, NGOs, SAUs).
- Landform form treatment and land leveling to improve water use efficiency (DoA, DWDU, ICRISAT, SAUs).
- Seed-cum-fertilizer drill, planters for multi crops, zero till planters, power sprayers and other agriculture machinery to be introduced to support resource use efficiency.
- Agronomic and management interventions, like balance nutrients management, INM, weed management, IPM, IDM.
- Promotion of "mobile artificial insemination units"; "disease diagnostic centre"; fodder development programme on waste and fallow land with reuse of wastewater; stall feeding for sheep, goats and other small ruminants.
- Increasing collection centers for vegetables and milk.
- Promotion of other income generating activities viz, seed bank, vermicomposting, primary processing and value addition, apiculture, fisheries, feed cakes/blocks, vocational training.
- Establishment of value addition and agro processing units under public-private-partnership (PPP) mode with market linkages in order to increase the profitability.
- Establishment of desiccated coconut powder unit, coir pith industries for coir boards, virgin oil production firm.
- capacity building of farmers and all other stakeholders
- Establishment of custom hire service centres at GP level,
- Supply of farm machineries at subsidized rates,
- Encouraging group approach for sharing of labour for field operations
- establishment of rural godown at GP level,
- Establishment of agro processing units, primary processing centre and facilities for transportation to markets,
- Development of cold storage facility.
- Streamlining procurement and providing MSP.
- Timely access to finance with zero interest for SF&MF.
- Strengthening of SHG
- Direct cash transfer.
- To establish biocontrol laboratories for production of bio-control agents.

- To put in place an early warning system for pest and disease management to avoid crop losses.
- Convergence of different schemes
- Formation of Steering/Coordination committees to address day to day issues thru effective monitoring and evaluation.

The district group on Tumkur district planned timelines for the year-1 as in Table 1.

Table 1. Activities and timeline for year 1 in Tumkur district

Activity	**Timeline**
Site demarcation Block 1: Coconut based system (Tiptur, CNHalli, Turvekeri) 3000 ha Block 2: Coconut, vegetable, fruit crops and animal husbandry) 3500 ha Block 3: Groundnut based system, small ruminents and dry land horticulture (Pavagada, Sira, Madhugiri, Koratagere) 3500 ha	Jan 2013
Baseline survey instrument	Jan 2013
Base line survey/characterization	Feb-March 2013
Analysis of baseline data and prioritization of interventions	April 2013
Putting together project team and capacity building	May - June 2013
Implementation of the interventions of the pilot site	From June 2013 onwards

Bijapur (see Appendix 1)

The identified pilot site for implementation is Sindagi-Devarhaipargi with annual rainfall of about ~590 mm. the soil in the district are shallow to medium and deep black. Major crops grown in the district are pearl millet (Kharif); jowar (Rabi), chickpea, sunflower, groundnut, green gram; and pigeon pea is coming up in a big way. Indigenous cattle rearing is a feature with almost each and every farm family. Bijapur is the horticulture hub of Karnataka. Currently only 5-10% land is irrigated and groundwater depletion is a big problem. However, in next 4 year time, 60-70% of Bijapur will come under irrigation, so there is urgent need for meticulous planning for better resource use efficiency.

The group deliberated and agreed on the following constraints (see Appendix 2 & 3) which are apparently holding back the productivity and livelihood improvement in the district;

- Water scarcity
- poor quality water
- Erratic rainfall

- poor soil
- low forest cover
- fodder scarcity, only low yielding local breeds, some villages have no cattle, low biomass availability
- low mechanization
- Rabi based cropping system
- They are removing orchards due to lack of water
- low crop yields--far below the district and state averages
- Lack of alternative livelihoods--high rate of migration
- poor infrastructure--poor roads etc.
- low insurance cover for crops
- poor extension, lack of information
- large area is fallow under kharif (only 15-20% area under crops in kharif season)

In order to manage existing constraints, the group identified following action points (also see Appendix 4);

- Baseline and to fill the gaps in integrated watershed management thru in-situ and ex-situ water conservation structures
- Waste water use for fodder production
- Soil test based balanced and integrated nutrient management system
- Short-duration crop varieties during kharif season
- Intercropping and mixed cropping
- Dryland horticulture: drought resistant fruits like sitafal etc.
- crop diversification to high value crops
- Timely availability of quality seeds.
- Custom hire centers
- Horticulture (grapes, lime, pomegranate, onion) with drip irrigation
- Development of cold-storage facility
- Development of processing facility
- Marketing chain and warehousing
- IPM in fruits particularly for bacterial blight in pomegranate
- Capacity building of farmers and stakeholders
- Greenhouses and shade houses.

- Improved cattle breeds to be introduced
- To introduce improved feeding regime and crop residue utilization.
- using fallow lands to produce fodder
- introduce poultry
- In-land fishing where water is there
- Income generation activities (skill development, coal making using prosopis julifera, feed marketing, neem-cake)
- SHGs and micro-enterprises
- Dairy development--only 77 village have dairy cooperative societies. More need to be formed
- apiculture, specially in sunflower growing areas
- vermicomposting to be encouraged
- Azola to be grown as INM and cattle feed protein supplement
- Horticulture nurseries, bio-fuels to be developed (*Jatropha*: 3081 beneficiaries)
- Precision irrigation systems
- Market linkages
- Community organization
- Credit and subsidies

The district group on Bijapur district planned timelines for the year-1 as in Table 2.

Table 2. Activities and timeline for year-1 in Bijapur district						
	Priority Activities	**Gaps & Constraints**	**R&R**	**Time-line**	**Nodal Officers**	**M&E**
1	Watershed					
1.1	Baseline survey (PRA, RRA)		CG, Line-departments	1st month	DoA	ICRISAT
1.2	Knowledge-based EPA					
1.3	soil & water conservation activities, structures	Poor adoption; converge govt. schemes; 100% coverage of farmers' lands. Not done right now due to budget limitations	WDD	continuous	DWDO	ICRISAT/3rd party
1.4	Farmer and officers' training on the project, and SWM		SAUs, KVK, ICRSAT	1st 3 months	ICRISAT	
	Priority Activities	Gaps & Constraints	R&R	Time-line	Nodal Officers	M&E
2	Crop Intensification					
2.1	Seed replacement	poor access quality seeds	DoA, KSSCA, KoF, NSC	Pre-kharif	DoA	ICRISAT
2.2	Integrated Nutrient management (organic manures, bio-fertilizers,	knowledge, poor extension, purchasing power of farmers, missing credit link	DoA, ICRISAT	starting with May 2013	DoA, Lead bank managers	District admin/ZP
2.3	Introduction of short-duration crops in kharif fallow: Farmer field demos	scanty & erratic rainfall, rabi is the key	SAU, ICRISAT	This kharif	ICRISAT	ICRISAT, SAU
2.4	Custom hiring to be established and encouraged	Poor access to implements	DoA, Coop societies, NGOs	Begins in March-April	DoA	ZP/Distt. Admin, SAU
	Priority Activities	Gaps & Constraints	R&R	Time-line	Nodal Officers	M&E

3.1	Baseline survey, mapping & characerization		ILRI, AHD	1-3 months	AHD	ILRI
3.2	Identifying feed improvement opportunities		ILRI, ICRAF	Right after baseline survey	ILRI, AHD	ILRI
3.3	Fodder trees/Agroforestry	lack of knowledge, lack of funds in govt. schemes, severe lack of biomass	ICRAF, Forest department	1st month onwards	Forest department	ICRAF, ZP
	Priority Activities	Gaps & Constraints	R&R	Time-line	Nodal Officers	M&E
4	Livelihoods					
4.1	Development of a list of bankable projects		DRDA	1st month	PD-DRDA	ZP
4.2	Encourage vermi-composting, Ajola, nurseries	Lack of knowledge and capital, poor market linkage	relevant line departments, leverage NRLM		ZP	CEO, ZP
5	Horticulture					
5.1	Protected cultivation of F&V: Farmer Demos		Deptt. of Horticulture	After baseline	Director DoH	Director, DoH
5.2	Encouraging food processing (Single window clearance), Wine park and Wineries	lack of capital, connectivity	DIC	after baseline survey	Director DIC	DC, CEO-ZP

Chikmagalur (see Appendix 1)

Chikmagalur district receives on an average 1904 mm annual rainfall (Hilly zone: 1373 to 3263 mm, Plain tract: 519-748 mm). Soils are predominantly red – sandy to clay with pH ranging between 5.5 to 6.0 in Malnad and neutral to alkaline in transitional and dry zone. Out of 7.2 lakh ha geographical area, 3.31 lakh ha is cultivable and 1.13 lakh ha is under horticultural crops. Out of total 28% is covered with forests. Ragi, paddy, maize and pulses are important dryland crop; sesamum, sunflower and groundnut are important oilseed crops; coffee, coconut and arecanut are important plantation crops. Veggetables are grown in about 11964 ha and spices in 13070 ha. Livestock rearing is predominant in Kadur,Tarikere and Chikmagalur.

The district group identified and agreed on following constraints (see Appendix 2 & 3) acting as stumbling block for livelihood improvement in the district;

- Water scarcity
- Labour scarcity
- Lack of access to market
- Acute power shortage
- High cost of cultivation
- Low resource use efficiency (WUE and NUE)
- Lack of storage facility (Narrow window of procurement)
- Post harvest losses – lack of processing units – minimum support price – Exploitation by middleman
- Fodder scarcity
- Poor mechanization
- Lack of access to information
- Lack of convergence of schemes
- Soil degradation
- Low yield of dryland crops
- Lack of Allied activities
- lack of improved seeds
- Pests and diseases (Yellow leaf disease)
- Infrastructure – connectivity
- Indiscriminate use of fertilizer and water
- Forest encroachment
- Unavailability of credit on time

Area of operation was decided to be 10000 ha during the year-1.

Maidan and dryland region (Tarikere, Kadur and part of Chikmagalur)

- Integrated Watershed Development approach (size of watershed 1000 ha each) = 8000 ha

Hilly region

- Integrated Watershed Development approach (size of watershed 500 ha each) = 2000 ha

In order to manage existing constraints, the group identified following action points (also see Appendix 4);

- Integrated Watershed Development (*In-situ* moisture conservation and runoff water harvesting measures, improvement to enhance the storage and percolation capacity, etc) (WDD, DoA, ICRISAT, IWMI, NGOs/CBOs)
- Rejuvenation of existing tanks by desilting, bunds strengthening, sluice gate (WDD, PRED, Mines and Geology, ICRISAT, IWMI)
- Construction and maintenance of community water bodies (gokatte, local ponds, etc) (WDD, PRED, Mines and Geology, ICRISAT, IWMI)
- Borewell recharge pits (WDD, PRED, Mines and Geology, ICRISAT, IWMI)
- Micro irrigation – Drip and sprinkler to be promoted (DoA, WDD, IRRI, IWMI, AVRDC)
- Water efficient crops and varieties (DoA, WDD, IRRI, IWMI, AVRDC)
- Mixed cropping with short duration pulses followed by ragi (DoA, IRRI, DoH, AVRDC)
- Coconut and mango with cowpea, green gram, horsegram (DoA, IRRI, DoH, AVRDC).
- Balanced nutrient application (DoA, ICRISAT, IRRI, AVRDC, DoH)
- Compost/green manuring/vermicomposting (DoA, ICRISAT, IRRI, AVRDC, DoH)
- Mechanization (DoA, WDD, IRRI, IWMI, AVRDC)
- Customised service (DoA, WDD, IRRI, IWMI, AVRDC)
- Transplanter and combined harvestor (DoA, WDD, IRRI, IWMI, AVRDC)
- Strengthening of artificial insemination to improve low yielding breeds of cattle and goats (ILRI, DoAH)
- Napier grass, Multi cut bajra, Multi cut jowar on farm bunds; Suspenia, Jack, drumstick, Leucenia on farm boundary and fallow/waste lands (ILRI, DoAH, DoA, WDD)
- IPM, IDM, Crop rotation (DoA, CYMMIT, ICRISAT)
- Summer tillage, trap cropping (DoA, CYMMIT, ICRISAT)
- Site specific diversification to high value crops and building storage facility (DoA, warehouse corporation (AVRDC, ICRISAT, IWMI)

- Agro-processing units on community basis (AVRDC, ICRISAT, IWMI)
- Horticultural crops (pomegranate, amla, mango, jack etc) on fallow lands (AVRDC, ICRISAT, IWMI).
- Existing schemes like processing (incentives) to be linked (Dept of Cooperation, Banks, NABARD)
- Micro-finance institutions (Dept of Cooperation, Banks, NABARD)
- Linking with banks/GoK with subsidy component (Dept of Cooperation, Banks, NABARD)
- Credit cooperative societies (Dept of Cooperation, Banks, NABARD)

The district group on Chikmagalur district planned timelines for the year-1 as in Table 3.

Table 3. Activities and timeline for year-1 in Chikmagalur district

Activity	**Time line**
Baseline survey instruments	Jan 2013
Baseline survey/characterisation	Feb-March 2013
Analysis of baseline data and prioritisation	April 2013
Project team and CB	April – May 2013
Implementation of the interventions	June 2013 onwards

Raichur (see Appendix 1)

The district group identified following constraints (see Appendix 2 & 3) in rainfed systems;

- Erratic rainfall and uncertain cropping plan
- Single/Mono crop system
- Low cropping intensity
- Climate change effects
- Improper mechanization/value chain machinery
- Low farm profitability
- Fodder- Quality/quantity issues

While the constraints (see Appendix 2 & 3) for Irrigated systems are as under;

- Delayed canal supply/ unequal distribution
- Poor groundwater availability and quality

- Monotonous cropping pattern-lack of diversity
- Salinity/ water logging
- High cost of production & low farm profitability
- Labour shortage
- Residue removal/burning
- Improper mechanization
- Imbalance plant nutrient-high doses-leaching-NO_3 contamination in ground water

The district group also identified specific livelihood issues and other institutional and infrastructure issues as under;

- High agrarian population
- No regular income
- No small scale enterprises
- No value addition facility
- Low literacy
- Poor access to input/output market
- Tenent system (Lack of easy credit facility)
- Less women involvement in decision making
- Non availability of livestock development centre
- Lack of fodder banks
- Lack of Seed systems
- Lack of information/knowledge about government schemes

In order to manage existing constraints, the group identified following action points (also see Appendix 4);

Rainfed systems:

- Intensification by intercropping in cotton, tur
- Cropping system optimization with resilient crop, varieties and component technologies
- Agro-forestry/dryland horticulture
- Circumstance specific integrated farming system
- Rainwater management/harvesting and use for supplemental irrigation with micro irrigation systems
- Value chain and mechanization

- Capacity building at different scales and levels

Irrigated Systems:

- Diversification/optimizing cropping system
- Micro-irrigation
- Laser land leveling in flood irrigation systems
- Mechanization-planting to processing
- Conservation agriculture
- Protected agriculture/ high-value horticulture crops
- Balanced plant nutrient application
- Capacity building at different scales and levels

Livelihoods:

- Small scale entrepreneurship
- Capacity building
- Value addition
- Integrated Farming System (IFS) modules-site-specific and farmer circumstance-specific
- Seed growers associations
- Service windows
- Promoting agro-forestry
- Empowering educated rural youth for animal husbandry (A.I. etc), agri-clinics

Institutional/ Infrastructure:

- Strengthening WUAs
- Kisan clubs at Taluk level
- Knowledge centers
- Young professionals capacity building
- Convergence
- PPP
- Farmer to farmers extensions
- Market linkage
- Post harvest processing and value addition

The district group on Raichur district planned timelines for the year-1 as in Table 4.

Table 4. Activities and timeline for year-1 in Raichur district			
Activity	**Time line**	**Roles/ Responsibilities**	**Nodal Agency**
Baseline survey instrument	January 2013	CG centers	DoA, CG
Base line survey/characterization	Feb 2013	CG centre	
Analysis of baseline data and prioritization	March 2013	IFPRI, ICRISAT,	
Putting together project team and capacity building	April 2013	DoA, CG	
Procurement of all required inputs like seed, fertilizer, m/c, etc	May 2013	DoA	
Defining the domains of available technologies	May 2013	CG, UASR	
Capacity building of service providers and farmers awareness camps	May 2013	UASR, CG	DoA, CG
Preparing training modules in local languages	Apr-May 2013	CG centers, UASR	
Establishment of pilot window service system	June 2013	CG and DoA	
Implementation of activities	June-onwards	CG, DoA	
Pilot ICT based information system	Aug 2013	CG	
Traveling seminar	Sept 2013	CG, DoA	DoA and CG
Establishment of seed production system	Oct 2013	DoA, UASR	
Project review, setting priorities, next year planning	Dec 2013	All partners	

Concluding Session

In his wrap up speech, Mr Kaushik Mukherjee, Additional Chief Secretary and Development Commissioner made few points to be considered for the implementation of project.,

- Use science-based data for identification of locations for water harvesting and other interventions.

- Water saving measures for horticulture, high-value vegetable crops for small farmers (vegetable soybean, etc.).
- In-situ SWC to reduce siltation of water bodies/tanks.
- Short-term action research by CGIAR partners.
- Emphasized on "implementation" rather than "recommendation", it has to be participatory for farmers acceptance.
- Some innovative technologies to be promoted like solar powered sprayers, GIS tools to identify and preserve important local tree species (e.g. sweet tamarind).

Dr KV Raju suggested following and urged not to by-pass these points,

- Use agro-climatic and soil moisture data for planning cropping systems e.g. short duration crops etc.
- GIS mapping of the pilot project features with different themes like terrain features, critical issues, crop intensity, vegetation, fodder, groundwater, subsidy, beneficiaries, schemes operated in the area, GDP before and after the interventions, existing market, processing and storage facilities, etc right from initial stage to time scale. The consortium team should come out with findings to improve the situation as diagnostic analysis/ resource inventory to identify issues.
- Monitor the situation crop season wise, month wise.
- Clarity among the partners should be brought in action plan.

Dr SP Wani conveyed the message that,

- This initiative has to be established as a model for holistic development of rural livelihoods as has been delivered in Bhoochetana.
- It is research for development, and so the plan should be meticulous as regards the technologies to be implemented with guarantee level of >95% success.
- Synergies among partners are very crucial for the success of the project.

In conclusion Dr Sarvesh thanked one and all for active participation and meticulous planning during two days workshop.

MoU signing on GoK-CGIAR Initiative

- Memorandum of Understanding (MoU) between International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Government of Karnataka for operationalizing GoK-CGIAR Initiative on "Improving Rural Livelihoods through Innovative Scaling-up of Science-led Participatory Research for Development in Karnataka" was signed on 6th June 2012 at Vidhana Soudha, Bengaluru in the presence of Hon'ble Chief Minister, Mr. DV Sadananda Gowda and Hon'ble Agricultural Minister Mr. Umesh V Katti.
- Based on the success of Bhoochetana program in Karnataka, Government of Karnataka requested ICRISAT to provide help in establishing learning sites in four revenue divisions of Karnataka, with the aim of improving rural livelihoods. To accomplish this task, seven centers of the CGIAR consortium (ICRISAT, IRRI, ILRI, IWMI, CIMMYT, IFPRI and ICARDA) have joined hands to provide technical support in establishing these sites.
- The Bhoochetana program is farmer participatory model based on ICRISAT's scaling up of strategic on-station natural resource management research which has been scaled-up in Karnataka through the World Bank supported Sujala-ICRISAT initiative that started with 13 watersheds in 2005 in six districts. This science-based productivity enhancement initiative is now the flagship project of the Government of Karnataka, benefiting three million smallholder farmers in rainfed areas over the last three years.
- The Bhoochetana program adopts the principles of consortium, convergence, capacity building and collective action in improving rural livelihoods by enhancing productivity of rainfed crops in 30 districts of the state.
- As part of the Bhoochetana program, an analysis of over 90,000 soil samples collected from farmers' fields from 30 districts was done by ICRISAT and the Department of Agriculture (DoA), leading to soil fertility maps and the publication of the Soil Fertility Atlas. The Bhoochetana program has enabled farmers to harvest 23-66% more yields of various crops (maize, sorghum, pearl millet, finger millet, chickpea, pigeonpea, groundnut, green gram, soybean and vegetables, etc). Economic returns from the improved balanced nutrient management practices ranged from 1.2 to 14.6%. Starting 2012, the GoK has decided to cover 5 million

hectares of rainfed area and to extend the project to irrigated crops like rice and sugarcane covering 0.5 million hectares.

- This convergence was scaled with the signing of a Memorandum of Understanding (MoU) between ICRISAT (representing the seven CGIAR Centers) and the Government of Karnataka.
- The MoU signing ceremony was attended by senior policy makers and officials of Government of Karnataka like Hon'ble Chief Minister Shri. DV Sadananda Gowda, Agriculture Minister Mr. Umesh V Katti, Chief Secretary Shri. SV Ranganath, Additional Chief Secretary & Development Commissioner Mr. Kaushik Mukherjee, Economic advisor to Chief Minister Dr. KV Raju, Dr. Subir Hari Singh, Principal Secretary (Agr.) Mr. Bhart Lal Meena, Director (Agri) Dr. KV Sarvesh and others along with Director General Dr. WD Dar, Drs. CLL Gowda, SP Wani, and K Krishnappa from ICRISAT.
- The MoU was signed by Director General William Dar and Mr. Kaushik Mukherjee, Additional Chief Secretary and Development Commissioner, Government of Karnataka in the presence of Chief Minister DV Sadananda Gowda and Agriculture Minister Mr. Umesh V Katti.

- The MoU signing culminated a series of discussions by the ICRISAT team led by Dr. Suhas P Wani (Assistant Research Program Director and Principal Scientist–Watersheds) with the partner CGIAR Centers and Government of Karnataka officials.
- Under the MoU, the consortium will operationalize scaling-up models in partnership with GoK to demonstrate integrated participatory research in rainfed and irrigated areas. It will also build the capacity of agriculture related institutions, state research organisations and universities (Bengaluru, Dharwad, Raichur and Shimoga) as well as University of Horticulture Sciences, Bagalkote along with different line departments of GoK in enhancing the impact of development programs through science-based support systems.
- Dr. Dar, in his remarks, assured on behalf of all the CG centers to fulfill the expectations raised with the success of Bhoochetana in the state and added that this new scaling-up initiative will be a boon to farmers and in turn to the state government by providing science-based solutions for sustainable agriculture and intensification. Prior to MoU

signing, on 24 March 2012, Dr. Dar led a delegation of seven CGIAR Consortium Centers to Bengaluru for a meeting with a high level committee of GoK officials.

- Dr. Dar emphasized the need to address the agriculture sector's holistic development through an inclusive market-oriented development (IMOD) approach, having market-entry points, appropriate institutional mechanisms, developing climate resilient farming villages, and addressing the physical scarcity of water with appropriate policy interventions and strengthened institutions for improving rural livelihoods. The urgent need to increase production, productivity and profits, and ensure sustainability was highlighted as important for climate-resilient agriculture. ICRISAT's strategic on-farm research combined with its comprehensive assessment of water for food and integrated water resource management approach has substantially reduced yield gaps and improved farmers' livelihoods in Karnataka.
- Hon'ble Chief Minister Shri Sadananda Gowda expressed his government's appreciation to ICRISAT for bringing together six CGIAR centers as partners in increasing the overall productivity of agriculture towards improving the livelihoods of smallholder farmers in the state. He pointed out that CGIAR institutions in India have developed many technologies that can help improve the country's agriculture sector. More farmers will benefit by scaling up the science-led and knowledge-based development of agriculture. To ensure that farmers are protected from frequent drought, steps must be taken to formulate a special action plan in collaboration with CGIAR.
- Chief Secretary SV Ranganath, on the other hand, expressed confidence that the initiative will be a game changer in the state in terms of benefiting smallholder farmers and achieving sustainable agricultural growth and we look forward to a good learning experience for various departments in the state. He assured that GoK will provide all the necessary support for this initiative to make it successful.
- Agriculture Minister Mr. Umesh Katti, highlighted that through Bhoochetana, Karnataka has received recognition in the country, and that Government of Karnataka is proud to be working with ICRISAT.

- Dr. KV Raju, Economic Advisor to the Chief Minister, expressed his happiness and stated that this is a dream come true to bring maximum number of CG centers together to benefit the farmers and called the initiative a bold step forward in harnessing the strengths of the CGIAR Centers to benefit the state's smallholder farmers.

- Drs. CLL Gowda and K Krishnappa also joined the ICRISAT delegation during the MoU signing and various discussions with GoK officials.

Appendix 1

Benchmark Locations with their Characterization

Benchmark sites	Annual Rainfall (mm)	Soil type	Major crops	Livestock	Market linkages
Tumkur	1000	Red Loamy Red Sandy Mixed Red and Black Soil	Coconut Paddy Maize Arecanut Vegetables Banana	Small ruminants, cattle	
Bijapur	590	Shallow to medium deep black soil	Pearl millet (Kharif) Jowar (Rabi), Chickpea Sunflower Groundnut Green gram Pigeon pea	Indigenous cattle and small ruminants	
Raichur	620	Black cotton soil and red soil	Paddy, Sunflower, Bajra and Groundnut Jawar, Bengal gram	Cattle and small ruminants	
Chikmagaluru	1904	Red loamy, red sandy, red clay	Plantation crops (Coffee, coconut, arecanut) Dryland crops (Ragi, Paddy, maize, pulses, groundnut, sunflower) Fruits, vegetables	Indigenous cattle and small ruminants	

Appendix 2

General Constraints across the Districts

Benchmark sites	General constraints
Tumkur Bijapur Raichur Chikmagalur	• Water scarcity • Labor scarcity • Lack of access to market • Acute power shortage • High cost of cultivation • Low resource use efficiency • Lack of storage facility • Lack of processing units • Fodder scarcity • Poor mechanization • Lack of access to real time information • Lack of convergence of schemes • Mono-cropping with subsistence

Appendix 3

Benchmark Sites along With Specific Constraints

Bench mark sites	Watershed development and rainfed agriculture	Irrigated agriculture	Livelihood options	Institutions, infrastructure and policy
Tumkur	• Soil erosion and poor fertility • Uncertain and low rainfall • Low crop yield in major crops (e.g. cereals, groundnut, pigeon pea, coconut, pomegranate) • Pest problem • Fodder scarcity • Large extent of fallow lands • Lack of improved cattle breeds and ruminants • Labor problem • Lack of multipurpose equipments	• Water, labour shortages • Low cropping intensity • Pest problem • Low farm profitability • Lack of market linkages • Lack of cold storage facilities for fruits and vegetables • Low access to credit • Lack of storage, processing, value addition, packing and marketing	• Seed bank • Dairy • Feed cakes and blocks • Vocational training • Vermicomposting • Sheep & goat raising • Primary processing and value addition • Fisheries • Sericulture • Apiculture	• Lack of livestock breed development centers • Lack of disease diagnostic centers • Lack of quality Seed systems • Lack of awareness about government schemes • Poor access to input and output markets • Low access to credit • Lack of storage, processing, value addition, packing and marketing
Bijapur	• Water scarcity • poor quality water • Erratic rainfall • poor soil • low forest cover • fodder scarcity, only low yielding local breeds, some villages have no cattle, low biomass availability • low mechanization	• Rabi based cropping system • low crop yields--far below the district and state averages • poor extension, lack of information • large area is fallow under kharif	• Lack of skill development • coal making has potential in Bijapur using *prosopis julifera* • lack of feed marketing • low usage of neem-cake • lack of micro-enterprises • lack of dairy cooperative societies • lack of apiculture activities	• Lack of alternative livelihoods--high rate of migration • poor infrastructure--poor roads etc. • low insurance cover for crops • Market • Community organization • credit and subsidies

Raichur	• Erratic rainfall and uncertain cropping plan • Single/Mono crop system • Low cropping intensity • Climate change effects • Improper mechanization/ value chain machinery • Low farm profitability • Fodder-Quality/quantity issues	• Delayed canal supply/ unequal distribution • Poor groundwater availability • Poor groundwater quality • Monotonous cropping pattern-lack of diversity • Salinity/ water logging • High cost of production & low farm profitability • Labour shortage • Residue removal/burning • Improper mechanization • Imbalance plant nutrient-high doses-leaching-NO_3 contamination in ground water	• High agrarian population • No regular income • No small scale enterprises • No value addition facility • Low literacy	• Poor access to input/output market • Tenent system (Lack of easy credit facility) • Less women involvement in decision making • Non availability of livestock development centre • Lack of fodder bank • Lack of Seed systems • Lack of information/knowledge about government schemes
Chikmagaluru	• Soil and water issue • Groundwater depletion • Poor water use efficiency • Low productivity • Poor fertilizer use efficiency • Labour shortage • Livestock issues • Fodder scarcity • Pests and diseases • Crop diversification and issues • Credit constraints	• Excess use of fertilizer • Soil and water issue • Poor quality seeds • Pests and diseases • Acidic soils, especially in plantation • Poor mechanization	• Lack of milk collection centers • Sheep & goat raising • Lack of primary processing and value addition facilities • Fisheries • Apiculture • Piggery • Floriculture • Lack of local micro-enterprises	• Lack of livestock breed development centers • Lack of disease diagnostic centers • Lack of quality Seed systems • Lack of awareness about government schemes • Poor access to input and output markets • Lack of timely and adequate finance

Appendix 4

Benchmark Locations and CG Centres Potential Interventions at Different Locations

CG centers	Tumkur	Bijapur	Raichur	Chikmagaluru
ICRISAT	• Soil test-based fertilizer recommendations • Introduction of short duration legumes and cereals • *In-situ* and *ex-situ* soil and water conservation • Crop intensification and diversification			
IWMI	• Water management (irrigation and drainage) • Micro-irrigation methods • Enabling policies • Potential solutions for WUAs			
CYMMIT	• Improvement of maize seed system and new cultivars • Mechanization • Conservation agriculture (CA) • Crop intensification			
ILRI	• Feed, fodder improvement • Mapping and characterization • Breed improvement			
IRRI	• Direct seeded rice • Improved varieties • Mechanization • Crop intensification			
ICARDA	• Wasteland rehabilitation using edible cacti. • Evaluation of lentil cultivars			
ICRAF	• Fodder and tree species • Agro-forestry • Wasteland rehabilitation			
IFPRI	• Baseline characterization • Policy interventions • Capacity building (knowledge integration) • Monitoring and evaluation			
AVRDC	• Short duration varieties • high value vegetables			

Program

Thursday, 3 January 2013

0900–0930	Registration	

Session 1 Inaugural Session

0930–0940	Welcome	BK Dharmarajan
0940–0950	Introduction of participants	
0950–1005	Objectives of GoK-CGIAR initiative	KV Sarvesh
1005–1020	Overview of the GoK-CGIAR initiative	Suhas P Wani
1020–1035	Inaugural address	SA Patil
1035–1050	Convergence and expectations from GoK-CGIAR Initiative	KV Raju
1050–1100	Remarks by Commissioner for Agriculture	V Chandrasekhar
1100–1110	Remarks by Principal Secretary, Agriculture	Bharatlal Meena
1110–1125	Presidential address	Kaushik Mukherjee
1125–1130	Vote of thanks	TK Prabhakara Setty
1130–1140	*Group photograph and Health break*	

Session 2 Technical Session I
Detailed planning for ***Tumkur*** benchmark location

Facilitators: Suhas P Wani, KV Raju

1140–1340	Irrigated crops Dryland crops Livelihood options Value addition institutions and rural development
1340–1430	*Lunch*
1430–1510	Presentation of outputs from Irrigated crops Dryland crops Livelihood options Value addition institutions and rural development
1510–1530	Discussions
1530–1545	*Health break*

Session 3 Technical Session II
Detailed planning for ***Chikkamagalur*** benchmark location

1545–1745 Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1745–1825 Presentation of outputs from
Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1825–1845 Discussions

Friday, 4 January 2013

Session 4 Technical Session III
Detailed planning for ***Bijapur*** benchmark location

0900–1030 Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1030–1045 Health break

1045–1130 Presentation of outputs from
Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1130–1200 Discussions

1200–1230 Lunch

Session 5 Technical Session IV
Detailed planning for ***Raichur*** benchmark location

1230–1400 Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1400–1415 Health break

1415–1500 Presentation of outputs from
Irrigated crops
Dryland crops
Livelihood options
Value addition institutions and rural development

1500–1515 Discussions

Session 6 Concluding Session

Chairman : Kaushik Mukherjee

1515–1615	Presentations of Detailed Action Plan of each district	District JDAs
1615–1645	Remarks and suggestions	KVRaju Bharatlal Meena V Chandrsekhar SA Patil KV Sarvesh Suhas P Wani
1645–1655	Concluding remarks	Kaushik Mukherjee
1655–1700	Vote of thanks	K Krishnappa

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Workshop Events through Lens

PowerPoint Presentations

About ICRISAT

ICRISAT
Science with a human face

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger, malnutrition and a degraded environment through better and more resilient agriculture.

ICRISAT is headquartered in Hyderabad, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. It belongs to the Consortium of Centers supported by the Consultative Group on International Agricultural Research (CGIAR).

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