Enhancing chickpea production in Rainfed Rice Fallow Lands (RRFL) of Chhattisgarh and Madhya Pradesh states of India following Improved Pulse Production and Protection Technologies (IPPPT)

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2010 – 2011

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Enhancing chickpea production in Rainfed Rice Fallow Lands (RRFL) of Chhattisgarh (CG) and Madhya Pradesh (MP) states of India following Improved Pulse Production and Protection Technologies (IPPPT)

Submitted by:

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur, CG; and Jawharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur, MP, a collaborative work on "Enhancing chickpea production in rainfed rice fallow lands (RRFL) of Chhattisgarh and Madhya Pradesh states of India following Improved Pulse Production and Protection Technologies (IPPPT)".

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1. Executive Summary: Activities 2010-11

Introduction:

- The overall objective of the project is "Harnessing Improved Pulse Production and Protection Technology (IPPPT) in the Rainfed Rice Fallow Lands (RRFL) of Chhattisgarh (CG) and Madhya Pradesh (MP)". In this project, chickpea was identified as a candidate pulse. It was further expanded in the collaboration with JNKVV and IGKV in farmer's field in the RRFL of CG and MP using IPPPT, as per the agreed work plan for 2010-2011.
- The RRFL of CG and MP, suitable for chickpea cultivation after rice, have black soils. These soils are broadly classified as vertic-inceptisols (shallow sandy loam) and deep vertisols (top layer consisting of 33% clay and at least 60 cm depth). Therefore the selection of sites for the project and farmers are restricted to vertisols.
- Rainfed vertic-inceptisols types of shallow soils are not suitable for double cropping with chickpea or any other crop without backup of substantial irrigation.

Base Line Data:

- Based on the detailed proforma developed during 2009-10 season in collaboration with the socio-economist to identify the constraints and opportunities of introducing chickpea in RRFL, base line data sets were collected on village profile, group profile and individual profile for both IPPPT-practicing and non-IPPPT-practicing farmers of the pilot villages and districts during 2010-11 crop season. Preliminary analysis indicated that RRFL offers ample opportunities for the cultivation of chickpea. However, non-availability of seeds of improved varieties and production technologies, crop protection awareness, assured price and market, and uncertainties of weather and diseases are the major constraints for large-scale cultivation and expansion of chickpea.

Selection of Sites and Farmers

- A total of 2039 farmers in 82 villages in four target districts in CG (Raipur, Durg, Kabirdham and Rajnandgaon) and MP (Jabalpur, Rewa, Damoh and Satna) were selected randomly during the 2010-11 season. Attempts were made to establish on-farm project activities in a cluster by forming groups of farmers in each village in a district.

On-Farm Activities:

- To achieve the milestones under each objective, three farmers' participatory activities: 1) Farmers Participatory Varietal Selection (PVS), 2) Improved Pulse Production and Protection technology (IPPPT) and 3) Village Level Seed System (VLSS) demonstration were conducted in the targeted villages.
- Site specific components of IPPPT such as seeds of improved chickpea cultivars, seed treatment with fungicides (Thiram, Bavistin) and Rhizobium, fertilizer application, line sowing following locally available seed-cum-fertilizer drill and or local adopted methods for chickpea, were used in establishing the trials.

PVS: The ten (JG 14, JG 11, ICCC 37, JGK 2, JG 322, JG 130, Vaibhav, JG 74, Vishal and Vijay) chickpea varieties evaluated in PVS trials in **six** farmers fields in RRFL with supplementary irrigation in CG and grain yield ranged from ~ 0.69 to 1.83 t ha^{-1}. In MP eight chickpea varieties (JG 11, JG 16, JG 14, JG 74, JG 130, JAKI 9218, JG 63, and JGK 2) were tested in eight PVS trials with supplementary irrigation. Grain yields ranged from 0.15 to 1.82 t ha^{-1}. The chickpea variety Vijay was the highest yielder (1.40 t ha^{-1}) across locations in CG.

IPPPT: A total of 1976, IPPPT on-farm demonstrations [CG (984) and MP (992)] were successfully conducted and harvested (≥ 98.9%) for seed yield and individual household seed systems. Mean yield of chickpea cultivar JG 74 and JG 11 were 0.81 t ha^{-1} and 0.88 t ha^{-1} in CG. Among the three improved varieties evaluated in IPPPT in MP; JG 16 gave grain yield of 1.71 t ha^{-1}. The mean grain yield across chickpea varieties and locations was 1.30 t ha^{-1} in MP.

VLSS: A total of 27 VLSS seed multiplication demonstrations were conducted and harvested [CG (9) and MP (18)] and about 39.47 t of seeds of farmers preferred varieties [Vaibhav (9.91 t), JG 130 (9.38 t), JG 315 (5.88 t), JG 11 (7.10 t) and Vijay (7.20 t)] were obtained. In addition to seeds stored from VLSS, 63.91 tons of seeds of all the improved varieties are stored by farmers in CG from IPPPT demonstrations. In comparison to CG farmers stored a total of 102.94 tons seeds of three improved varieties [JG 130 (69.30 t), JG 16 (27.45 t) and JG 74 (6.19 t)] in MP from IPPPT and 22.36 tons from VLSS. Approximately 125.3 tons of improved varieties chickpea seeds are produced in the pilot villages of MP from both IPPPT and VLSS.

Economics: The IPPPT package was highly profitable and cost effective. Percent gain by using IPPPT was up to 102% in CG and 41.7% in MP over local farmer practices. The benefit-cost ratio of chickpea production using IPPPT was approximately 1: 1.91.

Capacity Building: IPPPT orientation training was imparted to 2557 farmers in the target villages (CG = 1677, MP=880) during the crop season to educate farmers on major production constraints and their management practices.

Backstop Resarch: During 2010-11 crop season, backstop research was focused in two areas: 1). sustainable double cropping of RRFL with chickpea, and 2) management of emerging biotic streses in chickpea in RRFL.

1. Sustainable double cropping of RRFL with chickpea: Three experiments on: 1). **E**ffect of date of sowing on yields of chickpea sown after the harvest of rice in the RRFL- ecologies, 2). **E**ffect of supplementary irrigation where ever available on the production of chickpea sown after rice harvest in RRFL- ecologies, and 3).**T**otal productivity of rice- chickpea cropping system, by replacing traditional long duration rice varieties with early maturing rice varieties/ hybrids in the RRFL ecologies were conducted to expand the scope of double cropping of RRFL with chickpea. Salient findings of these experiments are as follows:

***1). Effect of date of sowing*:** Sowings of chickpea in early November gave the highest mean yield 0.96 t ha^{-1} in CG and 1.44 t ha^{-1} in MP as compared to mid and late sowings.

2). Effect of supplementary irrigation: Effect of supplementary irrigation was studied on chickpea variety JG 74 in 10 farmers fields each in CG and MP. One-irrigation through sprinkler at flowering significantly increased the yield by 32% in CG and 19% in MP.

3). Productivity of early maturing rice- chickpea cropping system: To quantify the productivity of rice-chickpea cropping system in the rainfed ecology, 20 farmers fields (five farmers from each district) in MP were selected. Detailed data sets on weather and crop emergence to harvest was recorded for both rice and chickpea crop. Improved short duration rice variety/hybrid (PS 3/ JRH 5) gave 72-150% more yield than long duration tradional rice cultivar(s) grown by farmers. Additionally 1.54 t ha^{-1} of chickpea was obtained as a second crop. Hence there is a greater scope for profitable and sustainable cropping of RRFL with chickpea.

2. Management of emerging biotic stresses in chickpea in RRFL: In our quest to minimize the losses caused by dry root rot (*Rhizoctonia bataticola*) and collar rot (*Sclerotium rolfsii*) the emerging diseases of chickpea in the RRFL, we intensified our efforts to understand the biology, epidemiology and to identify the host resistace to these two diseases. Salient findings of the experiments are as follows:

i) Soil moisture holding capacity ≥60% coupled with soil temperature 35ºC are the predisposing factors for dry root rot of chickpea.
ii) *R. bataticola* is highly variable both at pathological and molecular level. Isolates collected from diverse geographical locations in India showed genetic diversity and no relationship was found between clustering with AFLP markers and geographic origin.
iii) Standardization of resistance screening techniques based on sound epidemiological parameters to identify resistance sources for DRR is in progress. Prelimnary screening indicated lack of resistance in the improved wilt resistant cultivars as well as germplasm lines of chickpea.

2. Introduction

Chickpea can be grown profitably on residual moisture in medium–heavy vertisols (top layer~33% clay and at least 60 cm depth) in RRFL with light irrigation either at crop establishment and/or at flowering. Selection of RRFL with minimum irrigation is in line with central and state government supported initiatives to bring RRFL into double cropping by cultivating chickpea as a profitable second crop. There is a scope for expanding chickpea production in over 500,000 ha with or with out limited irrigation in RRFL in the states of CG and MP.

Farmers in the states of CG and MP are interested in cultivating of improved high yielding chickpea varieties with IPPPT. However, minimal irrigation is a prerequisite to recharge RRFL and utilize the residual moisture for chickpea establishment and sustainable production. Therefore the project partners (JNKVV, IGKV and ICRISAT) focused on promoting IPPPT (including high yielding short to medium duration wilt resistant/tolerant chickpea varieties as the major component of IPPPT) in partnership with farmers in the RRFL of CG and MP. The chickpea sowing period and crop establishment in RRFL depends upon the termination of monsoons and harvesting of rainy season rice crop. Normally rains continue up to the end of September and chickpea can be sown in the following three situations.

- **Un-irrigated early sown: 3rd week of September to 2nd week of October**
- **Un-irrigated / partially irrigated timely sown: 4th week of October- 2nd week of November**
- **Irrigated late sown: Up to 1st week of December**

3. Goal and Objectives

Goal

The goal of this project is “self sufficiency in pulse (Chickpea) production through increased productivity by expanding improved pulse (Chickpea) production and protection technologies, and establishing a village level seed system in the rainfed rice fallow lands in India”.

Objectives

1. To enhance capacity at field level for farmer-participatory research and extension (FPRE) by adoption and expansion of improved chickpea production and protection technologies in rainfed rice fallow lands.
2. To multiply and distribute farmer-preferred chickpea varieties along with IPPPT (including IDM, IPM and INM) for sustainable intensification of RRFL cropping systems.
3. To empower farmers and participating local institutions, on FPRE/IPPPT to establish village-based seed system(s) towards achieving self-sufficiency in seeds of farmer-preferred, improved varieties of chickpea at the village level.
4. To provide research backstopping for further improvement of chickpea varieties for traits and IPPPT components preferred by the farmers and traders in the target area.

4. Work Plan: Activity and Time Line

Annual review (2010-11) and planning (2011-12) meetings were conducted at IGKV for two days (26-27 July 2010). The work done during 2010-11 was presented by the Project coordinator, Principal investigators and Research Associates of the target districts of Chhattisgarh (CG) and Madhya Pradesh (MP). The technical program for the year 2010-11 was discussed by project partners from ICRISAT, IGKV, Raipur and JNKVV, Jabalpur, together taking into consideration remarks and suggestions from NFSM representatives. The time line followed to accomplish the agreed activities in the 2010-11 work plan (Annexure I) is given in Table 1.

Table 1. Time line for the NFSM-IPPPT chickpea, RRFL 2010-11 seasons

Period	Activity
Planning	
April-May	• Data collection, and analysis of on-farm and on-station activities 2008-09 • Report writing : 2010-11 activities
June-Sep	1. Annual review (2010-11) and work-plan (2011-12)development 2. Selection of sites and villages 3. Selection of farmers and introduction of the project and its objectives 4. Base-line data on constraints and opportunities of chickpea cultivation in RRFL 5. Soil sampling and analysis for micronutrient deficiency and other nutrients 6. Establishing rice- trials 7. Monitoring rice- trials 8. Data collection from rice- trials 9. Data analysis of rice- trials
Execution and Monitoring	
Sep-Nov	• Procurement of seeds of improved varieties of chickpea and distribution • Village level farmers' orientation in PVS, IPPPT, and VLSS demonstrations • Crop establishment with or without irrigation and seed cum fertilizer drill • Implementation of critical inputs (micronutrients/pesticides/pheromone traps)
Nov-Dec	• Crop monitoring, diagnosis of biotic/abiotic constraints and training to farmers • Trial-run of fertilizer- seed drill at JNKVV • On-farm hands on training on IPM/IDM at village level • Installation of pheromone traps
Jan-Feb	• Crop monitoring and hands on training to farmers • Plant protection for pod-borer management using insecticides/HNPV etc • Kisan mela at village and university level • Farmer's visit and training on IPPPT components at ICRISAT
Data Collection, Analysis, Report Writing; Annual Review: 2011-12 and Planning: 2012-13	
Mar-April	• Training of farmers in seed storage at household and village level • Crop harvesting and final data collection • Farmers perception on PVS, IPPPT, and VLSS components and demonstrations • Feedback and lessons learned
May-June	• Data analysis and report writing
July-Aug	• Review and Planning meeting 2012-13
April-cont.	• Back stop research on rice- chickpea cropping system and biotic streses at ICRISAT

5. Activities and Progress Report: 2010-11

5.1. Selection of Sites and Farmers

The procedure for selecting sites and farmers in the targeted districts for the 2010-11 postrainy season was exactly same as in previous seasons. Meetings were held with farmers and participatory rural appraisals (PRA) were conducted in each selected village. Objectives and activities of the on-farm research for development and rapid dissemination of IPPPT components and their timely application were explained to farmers. Perception of chickpea production, profitability, constraints and their affordable remedies were discussed with farmers. It was emphasized that the farmers are integral partners in this project to find solutions for sustainable chickpea production. Finally, farmers' participation was solicited on a voluntary basis.

A total of 1013 farmers from four districts [Raipur, Durg, Rajnandgaon, Kabirdham] in CG and 1026 farmers were selected from four districts [Jabalpur, Rewa, Satna, Damoh] in MP for IPPPT, PVS and VLSS on-farm trials during the 2010-11 postrainy season (Table 2).

Table 2: Number of farmers selected to conduct PVS, IPPPT and VLSS trials in CG and MP, in the 2010-11 season.

State		Farmers No			
		PVS	**IPPPT**	**VLSS**	**Total**
Chhattisgarh	Sown No[1]	8	996	9	1013
	Harvested No.[2, 3]	6	984	9	999
	Success (%)	75	98.79	100	98.61
Madhaya Pradesh	Sown No[1]	8	1000	20	1026
	Harvested No[2, 3]	8	992	20	1018
	Success (%)	100	99.2	100	99.2
Total CG & MP	**Sown No**	**16**	**1996**	**27**	**2039**
	Harvested No.	**14**	**1976**	**27**	**2017**
	Success (%)	**87.5**	**98.99**	**100**	**98.92**

[1]No of sown trials = Number of farmers selected.
[2]Twenty IPPPT trials failed in CG and MP (CG: Raipur and MP: Satna)
[3]Two PVS trials failed in CG (Rajnandgaon and Kabirdham) due to rains after sowing.

5.2. Base Line Data: Opportunities, Constraints and Solutions

Following the procedures discussed with the socio-economist, four sets of Proforma: [1). Village profile, 2) Group-Profile, 3) Individual Farmer Profile and 4) Non-Participating Farmers Profile] were developed to collect the base line data during 2009-10 and 2010- 11. The main objective of the base- line data collection was to identify the opportunities, constraints and solutions for introducing and scoping chickpea production and productivity in the target project districts of CG and MP. A consultant is hired to analyse base line data. The draft report on identified opportunities, constraints, and possible solutions for introducing chickpea in RRFL is as follows:

Opportunities

- The Government of India is committed to introduce 'Food Security Act (FSA)' in the near future and the success of FSA will depend on augmentation of agricultural production by raising agricultural productivity and/ or cropping intensities of mono-cropped, rainfed and marginal lands apart from other measures.
- Pulses complement cereals in both production and consumption. They also improve soil fertility; require less water in comparison to cereals and controls diseases and pests in rotation with cereals. Besides, pulses are relatively cheaper sources of protein.
- Despite their importance, the per capita availability of pulses has reduced significantly (from about 60 gm/day in 1950-51 to 32.6 gm/day in 2006).
- RRFL offers an enormous scope for pulse production and chickpea, because of its low water rerquirement, is the most suitable second crop.
- The analysis of data reveals that chickpea production in RRFL of MP and CG has opened several new avenues to the farmers in terms of increased farm income and employment

  - About 82 % of farmers reported a persistent increase in area of chickpea under rice fallow
  - Farmers could obtain an average additional income of Rs 9300 ha^{-1} because of cultivation of chickpea after rice.
  - Chickpea introduced through IPPPT generated on an average an additional employment of about 48-man days ha^{-1}
  - About 60 percent farmers perceived positive impact of chickpea cultivation on soil fertility in terms of increased yield of paddy.

Constraints

It is clear from the responses of farmers that a number of biotic, abiotic and socio-economic constraints are imposing serious impediments in production and intensification of chickpea in the states of MP and CG. Some of the important constraints are:

Abiotic constraints

- Cultivation of long duration rice varieties: About 87 percent of farmers' perceived cultivation of long duration rice as one of the limiting factors in timely sowing and profitable production of chickpea after rice, as this spares a shorter period for chickpea establishment and pod filling.

- Terminal drought: About one-third of the farmers reported terminal drought as a serious problem.
- Hardiness of soils: Hard vertisol interferes with germination of chickpea by forming a hard crust on the surface causing a poor crop stand.
- Low moisture holding capacity of several location specific soils.
- Development of soil cracks facilitates escape of available soil moisture.
- Soil salinity: Location specifics problem that needs immediate solutions.
- Smaller land holdings discourage individual smallholders from cultivating chickpea.

Biotic constraints

- High incidence of pod borer
- Occurrences of diseases such as
  - Dry root rot (ranked first among diseases by nearly 59 percent farmers)
  - Collar rot
  - Fusarium wilt
- Stray animals graze in chickpea fields and destroy the standing crops

Socio-economic constraints

- Lack of capital/credit to buy improved seeds, tools and implements
- Non-availability of short duration chickpea varieties at village and individual farmers level to plant immediately after the harvest of long duration rice crop
- Unavailability of desired chickpea seeds in required quantity as and when needed
- Lack of information on:
  - Moisture conservation practices
  - Improved varieties
  - Cultivation practices
  - Insect-pest control
  - Disease control
  - Demand and pricing
- Inefficient markets and poor seed delivery systems – The majority of sales and purchases take place in unorganized informal markets, which are unable to safeguard the interests of small and marginal producers who lack sufficient bargaining power due to their generation of low marketable surplus. Private dealers dominate the seed/input market and there is no guarantee of quality and authenticity of the inputs such as of seed, rhizobium and pesticides
- Instability of pulse prices including chickpea
- High price of improved seeds

Solutions:

- Increase R&D endeavour to develop short duration cultivars with resistance against dry rot, pod borer and terminal drought
- Advocate location specific short duration rice – short duration chickpea
- Strengthen formal seed markets and value chain to safeguard interests of farmers
- Advocate chickpea as a part of the farming system

- Develop cost-effective insect pest/ disease management technologies
- Provide for dissemination of relevant information on different aspects of crop production and protection, and soil and water conservation, markets and prices
- Develop sufficient regulatory and policy mechanisms to regulate role of private sector in seed and input marketing and delivery
- Provide easy institutional credit
- Enhance easy access to seed
- Develop a better seed multiplication and distribution system: Private sector, NGOs, SHGs/ Farmers organizations and government organizations can play a vital role in this area. It is imperative that these are encouraged to come forward in this direction and be supportive with adequate financial, technical and other resources. In this context there is need to strengthen the house hold level seed multiplication, processing and storage practices.

5.3. On-Farm Interventions: Establishment of PVS, IPPPT, VLSS Trials

5.3.1. Seed Distribution

A total of 31 tons of seed was distributed for PVS, IPPPT and VLSS trials in the four pilot districts of CG. Of the total seed distributed, 60 kg seed of eight improved varieties (JG 14, JG 11, ICCC 37, JGK 2, JG 322, JG 130, Vaibhav, JG 74, Vishal and Vijay) was used for PVS, 14.22 tons seeds of chickpea variety JG 11 and 14.40 tons of JG 74 used for IPPPT demonstrations and 1.08 tons chickpea variety Vaibhav and 0.33 tons of Vijay were used in VLSS trials.

Similarly, in MP a total of 31.7 tons of seeds were distributed for PVS, IPPPT, VLSS trials in the four target districts. Of this, 32 kg seeds of eight improved varieties (JG 11, JG 14, JG 16, JG 63, JG 74, JG 130, JGK 2, and JAKI 9218) were used for PVS, 30 tons seeds of three varieties (JG 74, JG16, JG 130) for IPPPT demonstrations and 1.34 tons of Vaibhav and Vijay were used for VLSS.

5.3.2. Mechanization: Introduction of Zero till seed drill

To facilitate an assured chickpea crop establishment utilizing the residual soil moisture left by the preceding rice crop, **zero till seed-cum-fertilizer drills** (modified and manufactured by IGKV, Raipur, CG) were two in each target district of CG. Farmers' used perception on the introduction and performance of seed drill was obtained. There is a mixed reaction about the performance of these drills in the targeted districts/villages. Farmers with small holdings preferred direct seeding by a locally improvised method such as *Nagar Nari*, while medium to big farmers preferred tractor attached seed-cum-fertilizer drills (Local make). The zero till seed–cum-fertilizer drills (designed and manufactured by National Agro Industries, Ludhiana) was purchased and test-run in MP and at ICRISAT. These machines are under modification and testing. Preliminary results indicated that the National seed-fertilizer-drill needs soil and location specific modifications. A chickpea crop was established in larger areas using a locally manufactured seed/fertilizer drill (*Khuriee*) in MP.

5.3.3. Establishment: PVS, IPPPT and VLSS

Out of 2039 on-farm trials, a total of 2017 [PVS (14), IPPPT (1976), and VLSS (27)] were successfully established and harvested in the targeted villages/districts of CG and MP. All PVS, IPPPT, and VLSS, trials were sown between 19 November and 5 January, 2010 in 32 villages of 4 districts of CG, and between 10 November and 17 December, 2010 in 48 villages of 4 districts of MP (Table 3**).**

Site specific components of improved chickpea production technology, such as seeds of improved chickpea cultivars, seed treatment with fungicides, fertilizer, line sowing using (Indira seed-cum-fertilizer drill in CG and Khuriee in MP) and/or a locally improvised device such as *Nagar Nari* were used to establish the chickpea crop in the on-farm PVS, IPPPT, and VLLS demonstrations. Further details of the each of these interventions, including number of villages and farmers in each district and state etc are given in Table 3. Data so obtained from each of the successful farmers' participatory PVS, IPPPT and VLLS is presented in the following section.

Table 3. Summary of successfully conducted and harvested participatory varietal selection (PVS), improved pulse production and protection technologies (IPPPT) and village level seed system (VLSS) trials in Chhattisgarh and Madhya Pradesh during 2010-11 season.

State	District	PVS No.[a]		IPPPT No.[b]		VLSS No.[c]		Total No.	
		Villages	Farmers	Villages	Farmers	Villages	Farmers	Villages	Farmers
Chhattisgarh	Raipur	2	2	6	238	1	3	9	243
	Durg	2	2	5	248	2	2	9	252
	Rajnandgaon	1	1	5	248	2	2	9	251
	Kabirdham	1	1	4	250	1	2	6	253
	Total No. 4	**6**	**6**	**20**	**984**	**6**	**9**	**32**	**999**
Madhya Pradesh	Jabalpur	2	2	13	250	1	1	16	253
	Rewa	1	2	6	250	3	5	8	257
	Satna	2	2	13	242	1	2	16	246
	Damoh	2	2	5	250	1	10	8	262
	Total No. 4	**7**	**8**	**37**	**992**	**6**	**18**	**48**	**1018**
CG&MP total	**8**	**13**	**14**	**57**	**1976**	**12**	**27**	**82**	**2017**

Chhattisgarh
Districts: Raipur, Durg, Rajnandgaon, Kabirdham,
[a]PVS: Varieties sown: JG 14, JG 11, ICCC 37, JGK 2, JG 322, JG 130, Vaibhav, JG 74, Vishal and Vijay in plot sizes of 6x10m^2 and 10x8m^2 depending upon the availability of land.
[b]IPPPT: JG 74, JG 11 sown in 377.6 ha area in 20 villages and 984 farmers @ 0.20 to 0.40 ha per farmer
[c]VLSS: Breeder seed (Vaibhav and Vijay) used for VLSS

Madhya Pradesh
Districts: Jabalpur, Rewa, Satna, Damoh
[a]PVS: Varieties sown: JG 11, JG 16, JG 14, JG 74, JG 130, JAKI 9218, JG63, JGK 2 in plot sizes of 6 x10m^2 to 10 x 8m^2 depending upon the availability of land.
[b]IPPPT: Varieties sown: JG 74, JG 16, JG 130 in 396.8 ha area in 37 villages and 992 farmers @ 0.2 to 0.4 ha per farmer
[c]VLSS: Foundation/certified seed (JG 11, JG 130, JG 315) used for VLSS

5.3.3.1. Farmers Participatory Varietal Selection (PVS) Demonstrations:

A total of 6 PVS trials in CG and 8 in MP were harvested (Table 3). A list of the farmers who participated in the PVS trials are given in **Annexure II.**

Among the ten chickpea varieties evaluated in PVS (Table 4) in CG, chickpea variety Vijay produced maximum grain yield (1.34 t ha^{-1}) and was closely followed by JG 11 (1.30 t ha^{-1}), JG 14 (1.25 t ha^{-1}). Farmers preferred JG 74 followed by JG 14 in Raipur. Farmers preferred Vijay, JG 11 and JG 74 over other varieties in Durg, Rajnandgaon and Kabirdham. The criteria for selecting this particular variety was its appealing plant type and bigger seed size compared to other test varieties.

In MP, chickpea variety JG 16 topped the list (1.12 t ha^{-1}) closely followed by JAKI 9218 (0.95 t ha^{-1}) (Table 4). Farmers preferred JG 130 in Rewa districts because of their higher yield and desirable grain size whereas JG 16, which produced a higher number of branches per plant and had more pods per plant compared to other varieties, was liked in Jabalpur, Satna and Damoh. All test varieties had high resistance to wilt but had marked incidence of dry root rot and collar rot, the new potentially emerging diseases of chickpea.

Table 4. Performance of chickpea varieties (yield t ha^{-1}) in the PVS trials conducted in farmers' fields in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

Variety	**District / Yield (t ha^{-1})**				**Mean**
Chhattisgarh	**Raipur**	**Durg**	**Rajnandgoan**	**Kabirdham**	
Vaibhav	1.02	1.44	1.17	0.9	1.13
JGK 2	0.91	0.85	0.83	0.69	0.82
JG 14	1.24	1.57	1.16	1.01	1.25
JG 74	1.46	1.05	1.17	1.16	1.21
JG 11	1.13	1.26	1.83	0.99	1.30
JG 322	0.94	1.21	1.19	0.9	1.06
Vijay	1	1.78	1.54	1.03	1.34
ICCC 37	0.99	-	-	0.69	0.84
JG 130	-	1.21	1.5	-	1.24
Vishal	1.04	-	-	-	1.04
Madhya Pradesh	**Jabalpur**	**Rewa**	**Satna**	**Damoh**	**Mean**
JG 11	0.88	0.39	0.30	0.98	0.63
JG 16	1.57	0.55	0.56	1.82	1.12
JG 14	0.93	0.27	0.36	1.07	0.65
JG 74	1.16	0.44	0.55	1.29	0.86
JG 130	1.26	0.57	0.46	1.15	0.86
JAKI 9218	1.49	0.53	0.33	1.45	0.95
JG 63	1.10	0.54	0.35	1.63	0.90
JGK 2	0.78	0.15	0.29	0.79	0.50

5.3.3.2. Farmers Participatory Improved Pulse Production and Protection Technology (IPPPT) Demonstrations

Overall, more than 98.8% of the IPPPT demonstrations were successful (Table 5). Of 996 IPPPT demonstrations in CG, 12 trials failed in Raipur due to animal grazing and therefore data was collected from the remaining 984 trials. Similarly in MP, of 1000 IPPPT demonstrations, 8 trials failed in Satna because of lack of soil moisture leading to very poor germination. Hence data was collected only from 992 trials.

A total of 1976 (984 CG and 992 MP) IPPPT demonstrations (including seed priming, treatment with fungicides, insecticides, Rhizobium, PSB, Fertilizer and Pheromone traps) were successfully established in 0.40 ha areas in each of the participating farmers fields. The IPPPT demonstration trials were sown in CG without irrigation between 19 November and 5 January, 2010 at all locations using improved variety JG 11 and JG 74. In MP, IPPPT demonstrations were sown from 10 November to 17 December, 2010 in the four target districts using three improved varieties of chickpea (JG 74, JG 16, JG 130). All the test varieties were sown @ 30 kg 0.40 ha^{-1}. The list of the farmers participated in IPPPT demonstrations is given in **Annexure III.**

Table 5. Success (%) of IPPPT demonstrations conducted in farmer's field in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

State/ districts	IPPPT demonstration No.		
	Sown	Harvested	Success%
Chhattisgarh			
Raipur	250	238	95.2
Durg	248	248	100.0
Rajnandgaon	248	248	100.0
Kabirdham	250	250	100.0
Total	**996**	**984**	**98.8**
Madhya Pradesh			
Jabalpur	250	250	100.0
Rewa	250	250	100.0
Satana	250	242	96.8
Damoh	250	250	100.0
Total	**1000**	**992**	**99.2**
Grand Total	**1996**	**1976**	**99.0**

Table 6. Performance (Yield t ha^{-1}) of IPPPT demonstrations conducted in farmers' field in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

State/district	Variety	Farmers (No)	Area sown (ha)	Total Yield (t)	Average Yield (t ha^{-1})
Chhattisgarh					
Raipur	JG 74	238	95.2	69.19	0.73
Durg	JG 74	248	92.8	83.56	0.90
Rajnandgaon	JG 11	248	94.4	82.46	0.87
Kabirdham	JG 11	250	95.2	84.36	0.89
Total/Mean	**2**	**984**	**377.6**	**319.57**	**0.85**
Madhya Pradesh					
Jabalpur	JG 130	216	86.4	135.17	1.56
	JG 16	34	13.6	23.26	1.71
Rewa	JG 130	250	100.0	124.20	1.24
Satna	JG 130	242	96.8	87.28	0.90
Damoh	JG 16	196	78.0	114.07	1.46
	JG 74	54	22.0	30.99	1.40
Total /Mean	**3**	**992**	**396.8**	**514.97**	**1.30**

In CG, the mean yield of JG 74 and JG 11 was 0.85 t ha $^{-1}$ across locations and villages. The highest mean yield of JG 74 was 0.90 t ha $^{-}$1 in district Durg. In comparison to CG the mean grain yield in MP was 1.30 t ha^{-1}. Chickpea cultivar JG 16 produced 1.71 t ha^{-1} of grain yields in district Jabalpur (Table 6).

Gain (%) in comparison to IPPPT Vs local practices

To compare the advantage of IPPPT over non-IPPPT, yield data of farmer's grown chickpea varieties using their practices were collected from 50 farmers in each district. In CG, the gain in chickpea yields ranged from 64 to ≥200% except in Durg district, where many non-participatory farmers used the IPPPT to grow chickpea. In Kabirdham, Rajnandgaon and Raipur districts the higher per cent gain in IPPPT over Durg was due to the first time introduction of IPPPT in the tribal backward areas. In these tribal villages, farmers grow traditional cultivars of chickpea using local practices. Gain in chickpea production using IPPPT over local farmer variety and practices were between 40 – 80 % across the locations and farmers in targeted districts of MP (Table 7).

Table 7. Gain (%) of IPPPT demonstrations over local farmer's practices in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

State/District	Variety	Yield (t ha^{-1})		
		IPPPT	Non-IPPPT	Gain (%)
Chhattisgarh				
Raipur	JG-74	0.73	0.24	204.16
Durg	JG-74	0.90	0.71	26.76
Rajnandgaon	JG-11	0.87	0.53	64.15
Kabirdham	JG-11	0.89	0.50	78.00
Madhya Pradesh				
Jabalpur	JG-130	1.56	1.10	41.80
	JG-16	1.71	0.95	80.00
Rewa	JG-130	1.24	0.80	55.00
Satana	JG-130	0.90	0.70	28.57
Damoh	JG-16	1.46	0.90	62.22
	JG-74	1.40	1.00	40.00

5.3.3.3. Village Level Seed System (VLSS) Demonstrations:

Out of 27 VLLS production trials, 9 and 18 farmers conducted VLLS trials in each of the four districts in CG and MP respectively. Depending upon the availability of assured irrigation, 1-2 farmers per district were selected to conduct these trials during the 2010-11 crop seasons. Farmers preferred chickpea cultivar Vaibhav and Vijay in CG and JG 315, JG 11 and JG 130 in MP. These were included in the VLLS trials (Table 8). The trials covered a 36.44 ha area (19.40 = CG, 17.04=MP). The list of farmers who conducted VLSS trials is given in **Annexure IV.**

5.3.3.3.1. Seed Production and Storage from VLLS demonstrations:

In CG, total seed productionof the chickpea variety Vaibhav and Vijay was 17.11 t, and in MP, total seed produced from JG 11, JG 130 and JG 315 varieties was 22.36 t (Table 8). Total seed produced and stored from VLSS is 39.47 t, which will be sufficient to cover an additional area of 526 ha @ 75 kg ha^{-1}during the 2011-12 crop seasons.

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Table 8. Seed production (t) in VLSS trials conducted in farmer's field in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop seasons.

State/District	Villages (No)	Farmers (No)	Variety	Area (ha)	Seed Sown (kg)	Seed Production (t)
Chhattisgarh						
Raipur	1	3	Vaibhav	5.0	360	3.05
Durg	2	2	Vaibhav	5.0	360	3.45
Rajnandgaon	2	2	Vaibhav	5.0	360	3.41
Kabirdham	1	2	Vijay	4.4	330	7.20
Total	**6**	**9**	**2**	**19.40**	**1410**	**17.11**
Madhya Pradesh						
Jabalpur	1	1	JG 11	4.00	320	7.10
Rewa	3	5	JG 130	5.00	360	5.28
Satana	1	2	JG 130	4.04	360	4.10
Damoh	1	10	JG 315	4.00	300	5.88
Total	**6**	**18**	**3**	**17.04**	**1340**	**22.36**
Total CG & MP	**12**	**27**	**5**	**36.44**	**2750**	**39.47**

5.3.3.3.2. Village Level Seed Systems (VLSS): Seed Production and Storage from IPPPT

In addition to the seed produced in VLSS, approximately 20% of the total chickpea production in IPPPT demonstrations was kept as seed by the participating farmers at individual household levels. In CG, 63.91 t seeds of the JG 11 and JG 74 variety have been stored by the farmers for the next crop season. Similarly, in MP chickpea grain stored as seed (20%) at individual house hold level by participating farmers is 102.94 t [27.45 t (JG 16), 69.30 t (JG 130), 6.19 t (JG 74))]. This seed will be sufficient for 1372.53 ha sowing in the next season in targeted districts of CG and MP (Table 9).

Table 9. Chickpea grain production (t) and storage (20%) at individual household level) from the IPPPT trials conducted in farmers fields in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

State /District	Village (No)	Farmers (No)	Variety	Area (ha)	Production (t)	Seed (t) (20%)
Chhattisgarh						
Raipur	6	238	JG 74	95.2	69.19	13.84
Durg	5	248	JG 74	92.8	83.56	16.71
Rajnandgaon	5	248	JG 11	94.4	82.46	16.49
Kabirdham	4	250	JG 11	95.2	84.36	16.87
Total	**20**	**984**	**2**	**377.60**	**319.57**	**63.91**
Madhya Pradesh						
Jabalpur	13	216	JG 130	86.4	135.17	27.03
	-	34	JG 16	13.6	23.26	4.64
Rewa	6	250	JG 130	100.0	124.20	24.82
Satana	13	242	JG 130	96.8	87.28	17.45
Damoh	5	196	JG 16	78.0	114.07	22.81
	-	54	JG 74	22.0	30.99	6.19
Total	**37**	**992**	**3**	**396.80**	**514.97**	**102.94**

5.3.3.3.3. Seed Storage from VLSS and IPPPT Demonstrations

Total seed stored from VLSS (100%) and IPPPT (20%) at village and district levels is 81.02 t in CG and 125.30 t in MP. This seed will be sufficient to cover additional area of 1010.93 ha in CG and 1670.66 ha in MP during the 2011-12 crop season (Table 10).

Table 10. Seed Storage (t) from VLSS and IPPPT trials conducted in farmer's field in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season.

State/ districts	Village (No)	Farmers (No)	Variety	Seed stored (t)		
				IPPPT	VLSS	VLSS+IPPPT
Chhattisgarh						
Raipur	6	238	JG-74	13.84		16.89
	1	3	Vaibhav		3.05	
Durg	5	248	JG-74	16.71		20.16
	2	2	Vaibhav		3.45	
Rajnandgaon	5	248	JG-11	16.49		19.93
	2	2	Vaibhav		3.41	
Kabirdham	4	250	JG-11	16.87		24.07
	1	2	Vijay		7.20	
Total	**26**	**993**		**63.91**	**17.11**	**81.02**
Madhya Pradesh						
Jabalpur	10	216	JG-130	27.03		38.77
	3	34	JG-16	4.64		
	1	1	JG-11		7.1	
Rewa	8	250	JG-130	24.82		30.1
	1	5	JG-130		5.28	
Satana	13	242	JG-130	17.45		21.55
	1	2	JG-130		4.1	
Damoh	5	195	JG-16	22.81		34.88
	-	55	JG-74	6.19		
	1	10	JG-315		5.88	
Total	**43**	**1010**		**102.94**	**22.36**	**125.30**
Grand Total	**69**	**2003**		**166.85**	**39.47**	**206.32**

5.3.4. Economics of IPPPT:

The recommended IPPPT package to grow chickpea in RRFL of CG and MP was highly profitable and cost-effective. On the basis of information gathered from 996 farmers in CG, gain in average net return was 102% (Table 11). The reason behind the high per cent gain in net return due to improved practice over the local practice in CG was the selection of RRFLs in the tribal backward areas, where farmers are cultivating traditional chickpea and use minimum inputs in terms of fertilizers/ insecticides/ fungicides/ improved varieties. Though the cost of the IPPPT package for chickpea production was 18.5% higher than the local farmer practices in MP, net returns using IPPPT was 41.7 % in MP more than local farmer practices. The benefit-cost ratio of chickpea production using IPPPT was estimated to be 1.87 in MP and 1.95 in CG.

Table 11. Net return (%) and benefit-cost ratio gains from the IPPPT trials conducted in farmers fields in the targeted districts of Chhattisgarh and Madhya Pradesh in the 2010-11 crop season

Particulars	IPPPT	Local farmers Practice	% increase / gain of IPPPT over local farmers practice
Chhattisgarh			
Input cost Rs/ha^{-1}	8500	6500	58
Yield kg/ ha^{-1}	830	495	79
Gross return Rs/ha^{-1}	17750	9900	79
Net return Rs/ ha^{-1}	9624	4762	102
BC ratio	1:1.95	1:1.52	
Madhya Pradesh			
Input cost Rs/ha^{-1}	9600	8100	18.5
Yield kg/ ha^{-1}	1380	1040	32.6
Gross return Rs/ha^{-1}	27600	20800	32.7
Net return Rs/ ha^{-1}	18000	12700	41.7
Benefit cost (BC) ratio	1:1.87	1:1.56	

5.3.5. Farmers Perceptions and Expectations

More than 2000 farmers were directly exposed to the use of IPPPT to obtain higher grain yield in chickpea in RRFL. Interaction with ≥3000 participatory and non-participatory farmers during periodical monitorings, village level group meetings and during their visit to ICRISAT indicated that almost all the participating and neighboring farmers were impressed and convinced about the advantage of the IPPPT, and expressed their willingness to adopt these technologies in the coming crop season. Several non-participatory farmers also booked and or bartered chickpea seeds with wheat for the next season to adopt IPPPT. The farmers are confident that they can grow chickpea and obtain higher yields by adopting the IPPPT package in their rice fallows with at least one irrigation. They are convinced that chickpea has provided them pertinacious grains, increased income and increased production of rice by improving soil fertility.

5.3.6. Capacity Building

The IPPPT orientation [including integrated nutrient management (INM), integrated pest management (IPM), integrated disease management (IDM), storage pest and production technology] programs were conducted in 64 in villages of CG and 40 villages of MP during the 2010-11 crop season to train farmers on major production constraints and their management. A total of 1677 farmers in CG state and 880 farmers from MP, attended training in target villages (Table 12). Further, hands–on training was also given to farmers during trial monitoring and visits to the research institutions.

Table 12. Capacity building: activities and training conducted during the 2010-11 crop season.

Title of the training	Village (No)	Farmers (No)	Duration (days)
Chhattisgarh			**No of Trainings**
IPPPT-orientation	13	392	1(13)
INM	12	269	1(12)
IDM: Wilt/CR/DRR, disease	10	215	1(10)
IPM: Pod borer	11	352	1(11)
IPM: Storage pest	11	286	1(11)
Seed production technology	4	46	1(4)
Sowing method and implement for increasing the nutrient and water use efficiency.	3	117	1(3)
Total	**64**	**1677**	**7 (64)**
Madhya Pradesh			
IPPPT-orientation	4	80	1(4)
INM	7	160	1(7)
IDM: Wilt/CR/DRR diseases	8	160	1(8)
IPM: Pod borer	6	120	1(6)
IPM: Storage pest	4	120	1(4)
Seed production technology	2	40	1(2)
Sowing method and implement for increasing the nutrient and water use efficiency.	5	120	1(5)
In service candidates	4	80	1 (4)
Total	**40**	**880**	**8 (40)**
Grand Total	**104**	**2557**	**104**

5.3.7. Lessons Learned from IPPPT Farmer Promotion and Adoption of Chickpea and IPPPT in RRFL

Economics

- Chickpea competes well with alternatives, is highly profitable and can improve livelihoods for poor farmers and their families.
- If rewards are sufficient, farmers will adopt and reinvest.
- Markets are not limiting for chickpea in India. Connectivity between the extension system (eg, DoA and NGOs) SAUs and ICRISAT is essential for further expansion of chickpea in RRFL.
- Good storage is crucial but currently a low priority for farmers – needs pest management.

Pest and disease management

- Pesticide quality is important and adulteration is frequently reported. Needs monitoring.
- Insecticide resistance reported in the West (associated with Cotton in India?). Needs addressing with alternatives.

- NPV can be integrated in IPM of pod borer management, but no infrastructure available for backstopping, quality control, production, legislation and policy.
- Diagnostic skills need to be taught to farmers, with technical backstopping.
    - Key life stages of pod borer essential for successful control
    - Resistance for wilt and susceptibility to stem rot and dry root rot: Is it climate change?
    - Early warning: for wilt, dry root rot and stem rot diagnosis
    - Technologies too complicated for some farmers.
    - Adequate technical backstopping research on new emerging diseases is essential and often lacking.

Micronutrient and Rhizobium

- Vigrous soil sampling and timely chemical analysis is the prerequisit for site specific application of minor and major nutrients.
- Rhizobia and plant growth promoters available in the maket are adulterated and need quality control and timely availability to the farmers

Mechanization and Crop Establishment

- This is the most important issue and needs focused private-public partnership approach. It is a issue that needs focused R&D?

Seed production

- Chickpea is a self-fertilizing crop. Once farmers have a variety they can maintain their own seed.
- There is always a need for technology inputs. We encourage low cost inputs for seed production.
- Self-help groups to take on role of seed production. This works and helps to ensure wider knowledge dissemination.

Dissemination

- Popular media such as newspapers and television give agriculture a low priority, so novel and alternative, local or traditional mechanisms need to be exploited to ensure widespread dissemination of information and knowledge.

5.4. Backstop Research:

During 2010-11 crop season, backstop research was focused in two areas: 1). sustainable double cropping of RRFL with chickpea, and 2) management of emerging biotic streses in chickpea in RRFL.

5.4.1. Sustainable double cropping of RRFL with chickpea: In order to further expand sustainable production of chickpea in RRFL, **t**hree experiments on: 1). Effect of date of sowing on yields of chickpea sown after the harvest of rice in the RRFL- ecologies, 2). Effect of supplementary irrigation where ever available on the production of chickpea sown after rice harvest in RRFL- ecologies, and 3).Total productivity of rice- chickpea cropping system, by replacing traditional long duration rice varieties with early maturing rice varieties/ hybrids in the RRFL ecologies were conducted to expand the scope of double cropping of RRFL with chickpea. Salient findings of these experiments are as follows:

***5.4.1.1. Effect of date of sowing*:** In our quest to identify the suitable period of chickpea sowing for maximum production utilizing the residual soil moisture after rice harvest, we conducted an experiment in 5 farmer's fields each in MP and CG. Sowings were done in three different periods: early (second week of Nov.), mid (Fourth week of Nov.) and late (First week of Dec.). Early sown chickpea gave highest yield [CG (0.96 t ha^{-1}) and MP-(1.44 t ha^{-1})] as compared to mid and late sowings (Fig. 1).

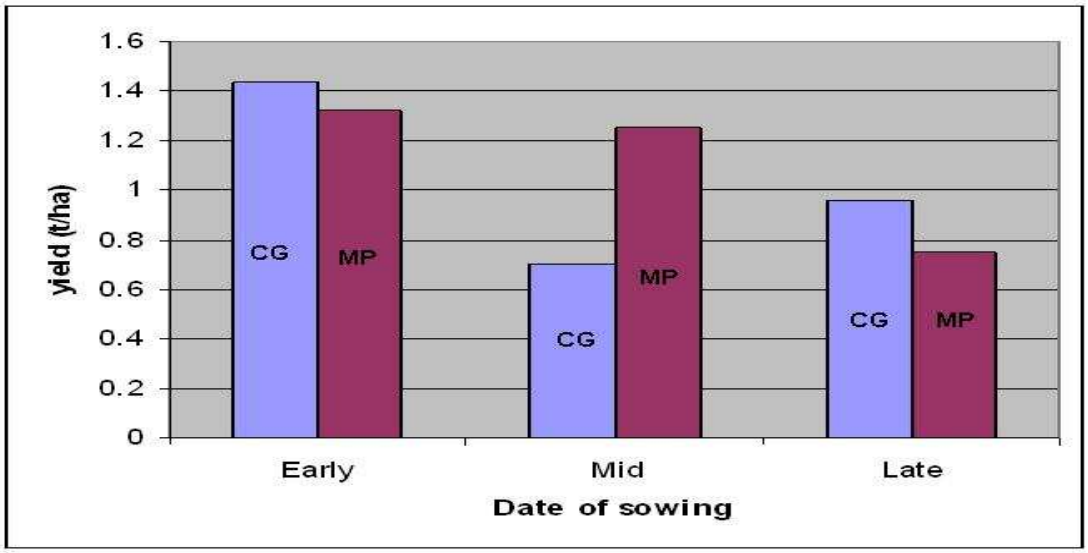


Figure 1. Effect of date of sowing on chickpea yield in the RRFL of CG and MP, 2010-11

5.4.1.2. Effect of supplementary irrigation: Effect of supplementary irrigation was studied on chickpea variety JG 74 in 10 farmer's fields each in CG and MP. One-irrigation through sprinkler at flowering significantly increased the yield by 32% in CG and 19% in MP as compared to unirrigated fields (Fig. 2).

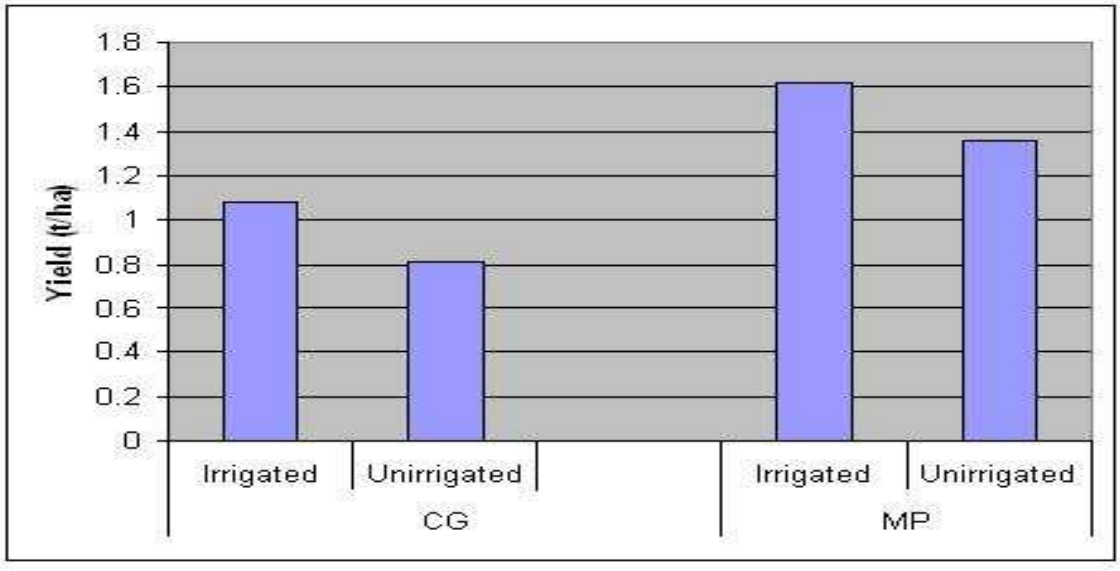


Figure 2. Effect of irrigation on chickpea production in the RRFL of CG and MP 2010-11

5.4.1.3. Productivity of early maturing rice- chickpea cropping system: To quantify the productivity of rice-chickpea cropping system in the rainfed ecology, 20 farmers fields (five farmers from each district) in MP were selected. Detailed data sets on weather and crop emergence to harvest was recorded for both rice and chickpea. Improved short duration rice variety/hybrid (PS 3/ JRH 5) produced 72-150% more yield than long duration tradional rice cultivar(s) grown by farmers (Fig. 3). Additionally 1.54 t ha^{-1} of chickpea was obtained as a second crop indicating that there is a greater scope for profitable and sustainable double cropping of RRFL with chickpea.

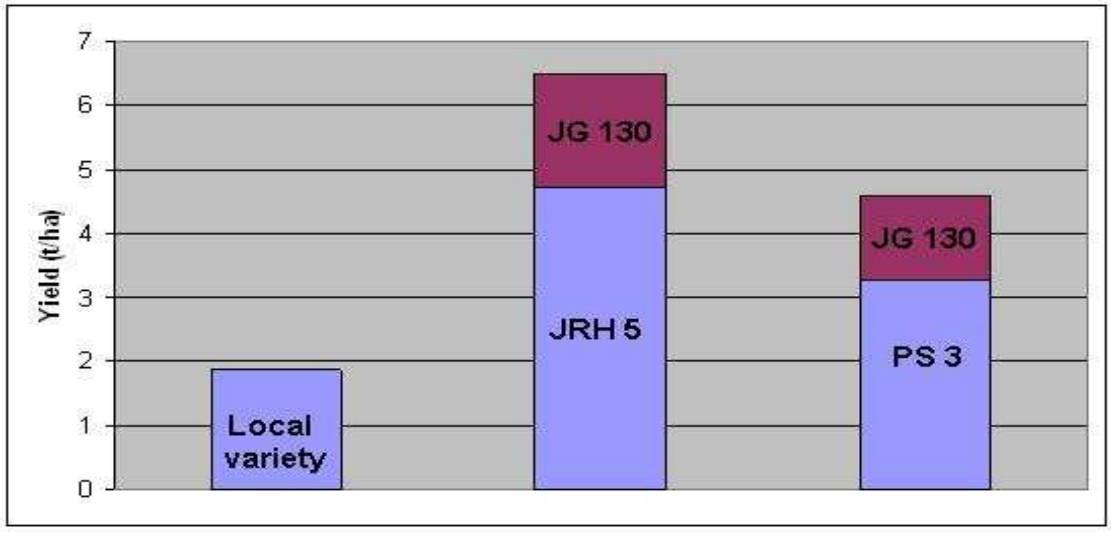


Figure 3. Yields in rice- chickpea cropping system and sole rice cropping system

5.4.2. Management of emerging biotic stresses in chickpea in RRFL: In our quest to minimize the losses caused by dry root rot (*Rhizoctonia bataticola*) and collar rot (*Sclerotium rolfsii*) the two emerging diseases of chickpea in the RRFL, we intensified our efforts to understand the biology, epidemiology and to identify the host resistace to these two diseases. Salient findings of the experiments are as follows:

i) Soil moisture holding capacity ≥60% coupled with soil temperature 35ºC are the predisposing factors for dry root rot of chickpea.
ii) *R. bataticola* is highly variable both at pathological and molecular level. Isolates collected from diverse geographical locations in India showed genetic diversity and no relationship was found between clustering with AFLP markers and geographic origin.
iii) Standardization of resistance screening techniques based on sound epidemiological parameters to identify resistance sources for DRR is in progress. Prelimnary screening indicated lack of resistance in the improved wilt resistant cultivars of chickpea.
iv) Standardization of resistance screening techniques for collar rot (CR) is also in progress and initial screening indicated no resistance to this disease in the core germplasm collection.

5.5. RRFL in Chhattisgarh: Technology adopted for chickpea production

RRFL

Farmers orientation

Seed conditioning

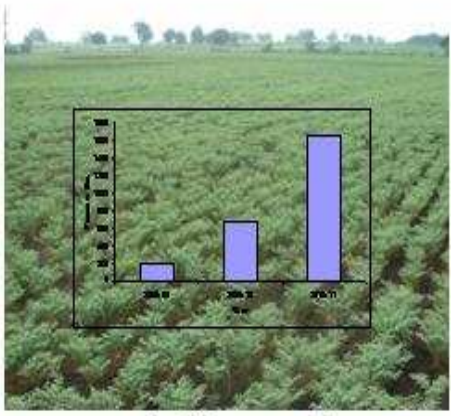
Crop establishment

Periodical monitoring

PVS trails

Biotic constraints

Harvesting



Achievement

5.6. RRFL in Madhya Pradesh: Technology adopted

Long duration rice

RRFL

Farmers orientation

Short duration rice

Introducing zero seed drill

Crop establishment

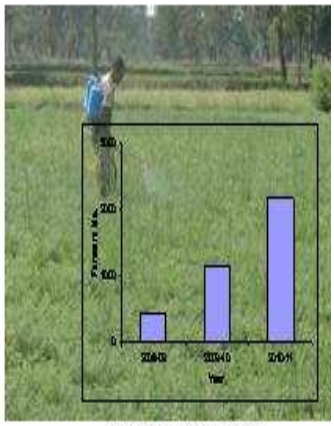
Periodical monitoring

IPM

Biotic constraints

Harvesting

Double cropping vs RRFL



Achievement

6. Publications

7. Periodical monitoring report

Organization	Purpose of Visit	Place of Visit (No)	No. of visit
IGKV, Chhattisgarh	Selection of sites and farmers	**21**	**67**
	Seed procurement and distribution	**20**	**26**
	Capacity building	**20**	**41**
	On-farm: establishment of PVS, IPPPT and VLSS trials	**20**	**93**
	Periodical monitoring	**20**	**149**
	Harvesting	**20**	**79**
	Final data collection	**20**	**73**
	Final data compilation and analysis	**1**	**1**
Total		**142**	**529**
JNKVV, Madhya Pradesh	Selection of sites and farmers	**67**	**140**
	Seed procurement and distribution	**50**	**36**
	Capacity building	**78**	**156**
	On-farm: establishment of PVS, IPPPT and VLSS trials	**179**	**213**
	Monitoring	**209**	**233**
	Harvesting	**63**	**86**
	Final data collection	**34**	**49**
	Final data compilation and analysis	**1**	**1**
ICRISAT, Hyderabad	Periodical monitoring	**2**	**5**
	Capacity building	**60**	**120**
DST, New Delhi	Periodical monitoring	**2**	**1**

8. Acknowledgements:

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I wish to extend my special thanks to Dr SK Rao, Principal Investigator Madhya Pradesh and his team, and Dr RN Sharma and his team who worked hard to meticulously impement the challenging agreed work plan of introducing chickpea in the rrainfed rice fallow lands in the target districts villages and to farmers of Chhattisgarh and Madhya Pradesh. Finally on behalf of the team I acknowledge enthusiastic participation of the farmers in successfully implementing the various activities of the project.

9. Annexures: I-IV

Annexure I

Work-Plan 2010-11

Enhancing chickpea production in RRFL of Chhattisgarh and Madhya Pradesh states of India following IPPPT

Activities: PVS, IPPPT, VLSS, and Training & Capacity Building (CB):

Data Collection: It starts at INDIVIDAL FARMER LEVEL from selection of farmers/sites/villages / blocks/district/state for all activities as follows:

Individual farmers:

- New farmers: 2010/11
- Farmers: 2009-10 carried over
- Farmers: 2008-09 carried over

Village (Block): ↓

- New villages: 2010/11
- Villages: 2009-10 carried over
- Villages: 2008-09 carried over

District (State) ↓

- District/State data:

↓

- Annual report 2010-11

General Instructions:

- Seed and inputs: PVS, IPPPT and VLSS demonstrations and Training & CB
- Detailed data collection from each new farmer and village: 2010-11
- Monitor farmers and villages of 2009-10 and 2008-09, collect data on area expansion, yield and their perception
- List of farmers: Name, village and area adopted/ expanded with IPPPT
- Weather data
- Periodical progress report

Important Note for data recording: PVS, IPPPT, VLSS, Capacity Building and Backstop Research:

- ICRISAT will send the soft copies of data record sheets that individual RAs responsible for each district will prepare in consultation with the Co-PI and use them for data recording and compilation of his/her target farmers/village/district.
- Please follow the data recording methodology as in the previous years.
- Data recording should be done in the BOND COPY (Data Record Book for a village in a District separately) and not in loose sheets
- Send the compiled data sets of your state to ICRISAT for further compilation.
- Alternatively ICRISAT can prepare the data record books, provided if it gets the name of the selected farmers/village/district/state on time (by 30 Sept 2010).

Objective1. To enhance capacity at field level for farmer-participatory research and extension (FPRE) in adoption and expansion of improved chickpea-pulse production and protection technologies (IPPPT) in rainfed rice fallow lands

Main Activity: Farmers participatory varietal selection (PVS)

Work plan: Identify farmers and evaluate location specific 5-7 improved chickpea cultivars for IPPPT through farmer's participatory varietal selection (PVS)

PVS Demonstrations: New Farmers (Plot size: 10 x 8m^2)

State	District	Village (No)	Farmer (No)	Varieties
CG	Raipur	2	2	JG 14, JG 11, ICCC 37, JGK 2, JG 322, JG 130, Vaibhav, JG 74, Vishal and Vijay
	Durg	2	2	
	Rajnandgaon	1	1	
	Kabirdham	1	1	
Total: CG		6	6	**10**
MP	Jablapur	2	2	JG 11, JG 16, JG 14, JG 74, JG 130, JAKI 9218, JG 63 and JGK 2
	Rewa	1	2	
	Satana	2	2	
	Damoh	2	2	
Total: MP		**7**	8	**8**
Grand total: (CG&MP)	8	13	14	

Objective2. To multiply and distribute farmer-preferred chickpea varieties along with IPPPT (including IDM, IPM and INM) for sustainable intensification of rainfed rice fallow cropping systems

Main Activity: IPPPT demonstrations

Work plan 2.1: Identify farmers and distribute seeds of location specific improve chickpea cultivars to farmers for IPPPT demonstrations in RRFL of target villages/blocks/states

IPPPT Demonstrations: New Villages and Farmers (Plot Size 0.2-0.4 ha)

State	District	Village* (No)	Farmers (No)	Varieties
CG*	Raipur	6	250	JG 74
	Durg	5	248	JG 74
	Rajnandgaon	5	248	JG 11
	Kabirdham	4	250	JG 11
Total: CG		20	996	
MP	Jabalpur	13	250	JG 16, JG 130
	Rewa	6	250	JG 130
	Satna	13	250	JG 130
	Damoh	5	250	JG 16, JG 74
Total: MP		37	1000	
Grand total	(CG&MP)		1996	

*** CG: Selection of farmers/ villages in each target district is in progress**

Work plan 2.2: At least 20% of the grain produced from IPPPT demonstrations will be stored at individual level house hold level for next crop season

Data to be collected 2010-11:

- Area expansion by individual farmers 2008-09 and 2009-10
- Collect soil samples from individual farmers representing the village/district before the rice and or chickpea cropping season and send to ICRISAT for chemical analysis. Please collect the samples following the standard protocols as explained during the last years research associates orientation training at ICRISAT.
- Quantify the number of farmers benefited through area expansion by 2008-09 and 2009-10 farmers
- Each new IPPPT farmers of 2010-11 will provide seeds for 0.8 ha (60 Kg seed) of the improved chickpea variety that he has received during 2010-11, to two new farmers in 2011-12 crop season. This needs to be recorded in details (name of the farmers and villages etc). **Action:** RAs of individual district will facilitate the process of procurement and redistribution of seed to two new farmers. Suggestive guidelines and local modus operandi AGREEMENT need to be prepared.

Objective 3. Empowerment among farmers and participating local institutions, on FPRE/IPPPT to establish village-based seed system(s) to achieve self-sufficiency in seeds of farmer-preferred, improved varieties of chickpea at the village level

Main Activity: Village Level Seed Systems (VLSS)

Work Plan: Identify farmer groups with assured irrigation and initiate seed multiplication program at village/district level

Village Level Seed Systems (VLSS) from FOUNDATION SEED

State	District	farmers (No)	Varieties (Area:5 ha/district)
CG	Raipur	3	Vaibhav
	Durg	2	Vaibhav
	Rajnandgaon	2	Vaibhav
	Kabirdham	2	Vijay
Total: CG		9	2
MP	Jabalpur	1	JG 11
	Rewa	5	JG 130
	Satna	2	JG 130
	Damoh	10	JG 315
Total: MP		18	3
Grand total (CG&MP)	8	27	5

VLSS based seed production plan 2009-10

- Seed production program must be planned in the villages where we produced seeds during 2009-10
- Enlisting of seed producing farmers
- Capacity building in seed production
- Quality assurance in seed production
- Seed processing and packaging will be facilitated at custom hiring basis
- Seed supply will be on first come first basis to the project farmers/villages/districts

Objective 4. Research backstopping for further improvement of chickpea varieties for traits and IPPPT components preferred by the farmers and traders in the target area
Main Activity: Research backstopping
Work plan: Identify biotic and abiotic constraints of chickpea production in RRFL

4.1. Biotic constraints

- Monitoring and identification of new emerging diseases in chickpea in RRFL
- Biology and epidemiology of the new pathogen(s) associated with wilt resistant chickpea varieties being promoted in RRFL
  - Dry root rot
  - Collar rot

Note: Chickpea diseased samples (plant mortality) including wilt will be collected and send to ICRISAT at periodical intervals. Protocols for collection and their dispatch to ICRISAT explained during the work plan development.

4.2. Abiotic constraints

- Monitoring and identification of location specific abiotic constraints in RRFL and determine their management strategies

4.3. Crop Establishment: Mechanization

Field trials to enhance fertilizer/seed
Experiment Title: Evaluation of zero till sowing of chickpea in RRFL.

Objective: To evaluate the feasibility of zero till sowing in the RRFL climates and soil types of MP and CG.

Methods and materials

- Among the 250 IPPPT farmers, introduce and or encourage zero tillage using available/new Zero till-fertilizer-seed drills representing the predominant soil types of the district.
- The main purpose is to save energy and establish the chickpea to capture the residual soil moisture left by the paddy rice.
- Committed timely imitative and chickpea crop establishment soon after the harvest of paddy is the prerequisite for the successful execution of this important experiment.

Treatments: Zero tillage vs. local farmers practice
Design: CRD
Replication: Individual farmer will represent a replication
Observations:

- Crop establishment score on 1-9 rating scale
- Crop agronomy score on 1- 9 rating scale
- Weed score on 1- 9 rating scale
- Yield parameters (Plot yield)
- Disease and pest scores on 1-9 rating scale and or follow text book protocols
- Economics of zero till vs. farmers practice

4.4. Rice–Chickpea Cropping System

Early maturing rice variety/hybrid followed by chickpea

Title of the experiment: Double cropping of the RRFL

Objective: To develop an assured and sustainable rice-chickpea cropping system for the RRFL in CG and MP

Methods and Materials:

Guidelines for developing experimental protocols:

- Selection of farmers: 5 Farmers in each district representing the predominant soil types of the village/district (Total farmers 20 in four target districts in each state).
- Soil sample collection before paddy harvest to estimate the soil fertility status
- Sow early maturing rice variety recommended and or performing better in the target district/state following standard practices for crop establishment
- Take observations as per the data record sheets (on crop establishment, agronomy, diseases and pests and yield parameters)
- Sow and establish chickpea crop following local and or zero till
- Record data on chickpea crop as per earlier years

Note: Location specific experimental details were discussed and guidelines were suggested to conduct experiments and collect the quantitative and qualitative base data. (Action: Co-PI and district RAs of the project sites /state).

Objective: 1, 2, & 3

Main Activity: Capacity Building and Training

Work plan 1. Impart training on IPPPT components (Sowing methods, IPM, IDM, INM and seed production technology) to participating farmers & Research Associates of participating institutions

State	Farmers (No)	Period of training (days)
CG	1677	64
MP	880	40
Total	2557	104

Work plan 2. Impart training to farmers' groups' /NGOs/ Local Institutions specifically on crop protection components of IPPPT as master trainers/ village scout.

Training location	Trainees (No)	Period of training (days)
CG		
MP		
ICRISAT		

Work plan 3. Prepare farmer friendly training and extension manuals (Hindi) on improved chickpea production technology for RRFL of target states

The project partners and the stakeholders approved the 2010- 11 work plans and suggested the future course of action for the project team based on their experiences in 2009 and 2010.

Annexure II

List of PVS demonstrations in individual farmer's field during 2010-11

State: Chhattisgarh

District: Raipur, **Village: Beldar Seoni and Budera**

1. Umendra Singh Beldar
2. Kanhaiya lal Sahu

District: Durg, **Village: Chirchar and Bamhani**

1. Kishore Amrit
2. Kailash Sahu

District: Rajnandgaon, **Village: Penderi**

1. Motilal Sinha

District: Kabirdham, **Village: Chandeni**

1. Rajendra Thakur

State: Madhya Pradesh

District: Jabalpur, **Village: Bhadarvwada and Jatana**

1. S. N Upadhayay
2. Ajad Patel

District: Rewa, **Village: Maidhi**

1. M. L Verma
2. Yaganarayan Kushwaha

District: Damoh, **Village: Hardua mudar and Banbar**

1. Sitaram
2. Girvar Singh

District: Satna, **Village: Gobraokhurd and Bairahatola**

1. Gajendra Singh
2. Lakhan lal Patel

Annexure III

List of IPPPT demonstrations in individual farmers' fields during 2010-11
State: Chhattisgarh

S. No	District: Raipur	S. No	District: Durg	S. No	District: Rajnandgaon	S. No	District: Kabirdham
	Name of farmers/Village		**Name of farmers /Village**		**Name of farmers/Village**		**Name of farmers/Village**
	Parsada		**Chirchar**		**Pendari**		**Nawagaon**
1	Netram/Sadhuram	1	Santosh Deshmukh	1	Anurag Das	1	Dhanush Ghariya
2	Sadhuram/Amarsingh	2	Angeshwar Sahu	2	Hamirdas Sahu	2	Kashi Ram Keshari
3	Mishrilal/Moolchand	3	Latabai Sahu	3	Kamta Prasad	3	Dhanna Ghariya
4	Keju/Dauwa	4	Punit Deshmukh	4	Bhojram	4	Parash Patel
5	Premlal/Keju	5	Khelan Desmukh	5	Amrita Bai	5	Ganesh Ghariya
6	Hemant/Dwarika	6	Dhannulal	6	Yogdas	6	Mangalu Patel
7	Dwarika/Pyare	7	Gaorishankaramrit	7	Basantram	7	Vishnu Ghariya
8	Keku/Shobhram	8	Mojiram	8	Kishun Sahu	8	Bhuvan Ghariya
9	Prabhu/Shakha	9	Rameshkumar	9	Motilal	9	Ramkumar Soni
10	Gautram/ Bhakha	10	Roshanlal	10	Santosh	10	Narayan Nath
11	Vishnu/Bhakha	11	Kishor	11	Girjabai Sinha	11	Bhagela Patel
12	Kashi/Pyare	12	Paras Sahu	12	Sukhram	12	Munna Sen
13	Lakeshwar/Pyare	13	Jaupalram Sahu	13	Mordhwaj Sinha	13	Kamal Kumar
14	Mehattar/Govind	14	Aajuram	14	Dukhuram	14	Chhavi Lal Sahu
15	Sandeep/Mehattar	15	Govardhan Desmukh	15	Narayan Sinha	15	Shyam Lal Yadav
16	Lalji/Rau	16	Devdhar	16	Ramhanuman	16	Ram Ji Patel
17	Ganesh/Jivrakhan	17	Hiramanlal	17	Chaturbhuj	17	Baisakhu Patel
18	Rajendra/Kejram	18	Purnima Bai	18	Neelkanth Bai	18	Ramghul Ghariya
19	Kejram	19	Devendrakumar	19	Radhedas	19	Jebu Ghariya
20	Rajaram	20	Baldausingh	20	Nakul	20	Gore Patil
21	Chandkumar/Jivrakhan	21	Chainsingh	21	Dukhitram	21	Mohan Lal
22	Nandkumar/Kejram	22	Vishahin	22	Shravan	22	Kodulal Patel
23	Mohan/Bishal	23	Omkar	23	Vedprakash	23	Govind Ghariya
24	Bisal	24	SantramSahu	24	Bhagvat	24	Ghana Markam
25	Rambagas/Dauwa	25	Dhannulal	25	Khemdas Sahu	25	Bhagwani Patel
26	Ashok/Hazari	26	Dukaluram	26	Khemudas	26	Dhelau Patel
27	Chamman/Daulal	27	Virendra	27	Giresh	27	Darolal Patel
28	Swarup/Jagat	28	Ranjana	28	Trilokchand	28	Ram Prasad Patel
29	Manglu/Parau	29	Khuman	29	Khemchand	29	Mohelal Patel
30	Keshlal/Ramlal	30	Bhagvan Gajbhiye	30	Amratdas	30	Chatur Ghariya
31	Mayaram/Nohar		**Amti**	31	Lakhan Sahu	31	Mahasingh Ghariya
32	Helendra/Dakur Ram	31	Devendrakumar	32	Jaithu Sinha	32	Son Ghariya
33	Hemendra/Thakur Ram	32	Purosottam Chaodhari	33	Bhuvanlal	33	Dashrath Markam
34	Bala/Madhaw	33	Indrajeet Sahu	34	Khilavanram	34	Ramchandra Markam
35	Santram	34	Churamanlal	35	Mithlesh Sinha	35	Gauri
36	Satyaprakash/Punitram	35	Ghanshym	36	Harprasad	36	Phirtu Patel
37	Harishankar/Punitram	36	Basantlal	37	Budhyarin	37	Rajkumar
38	Ramla/Buchawa	37	Jashwant	38	Kamtaprasad	38	Rohit Nath
39	Jhala/Makhan	38	Tarachand	39	Shivram	39	Bheekhu Nath
40	Chhaggan/Punnu	39	Bhupendra Kumar	40	Lakshan Thakur	40	Pawan Ghariya
41	Ramprasad/Sukhau	40	Bainendrakumar	41	Ramdas Thakur	41	Lalit Ghariya
42	Kiran/Lalji	41	Ashok Chaodhari	42	Heeran Sahu	42	Mohit Jaiswal
43	Prakash/Lalji	42	Raghulal	43	Laldas	43	Ashwani Ghariya
44	Subodh/Lala	43	Ganeshram	44	Tarun	44	Kaushal Das
45	Viswasa/lala	44	Rohitkumar	45	Raghunath	45	Usha Ghariya

46	Girdhari/Kashi	45	Gariba	46	Rajesh Sahu	46	Shanti Ghariya
47	Lekhram/Resham	46	Bhanuram	47	Viseram	47	Sher singh Gharia
48	Siya/Janak	47	RameshKumar	48	Ramcharan Mahar	48	Deliya Bai
49	Rugu/Malik	48	Ashok Kumar	49	Jagjeevan	49	Chetan Markam
50	Rambharosa/Rugu	49	Shivprashad	50	Chagan Sinha	50	Bheela Bai
51	Manglu	50	Ramchandra		**Rutala**	51	Kamala Ghariya
52	Tameshwar/Manglu	51	Baraturam	51	Kirtan Ram	52	Nanu Chhedavi
53	Dindayal Dahariya	52	Dukhitram	52	Ghoshi ram	53	Dongar Patel
54	Budharu satnami	53	Unmed Yadav	53	Basant Yadav	54	Budhraj Patel
55	Bisnath dahriya	54	Jayant Kumar	54	Mahendra Vaishnav	55	Dheeraj Markam
56	Chovaram satnami	55	Hiralal	55	Madheram	56	Milan Markam
57	Patwari Satnami	56	Ramcharan	56	Ramkumar	57	Mukesh
58	Nohar Nirmalkar	57	Santosh	57	Shuklal Verma	58	Manharan Nath
59	Shankar Nirmalkar	58	Shyamlal	58	Ghaneshwar	59	Ead Raman
60	Baratu Sahu	59	Aasharam	59	Jagdish	60	Sukhan
61	Rajendra Mehar	60	Bahurabai	60	Sudhlal	61	Santosh
62	Chaitram sahu		**Masabhat**	61	Tosan	62	Geeta Bai
	Motimpur	61	Markhande	62	Kuntilal	63	Lagani
63	Ishwar dewangan	62	Santosh Kumar	63	Narottam	64	Tirbeni
64	Dulari Bai	63	Kalyansingh	64	Parmeshwar	65	Patola
65	Shriprakash sharma	64	Kushalsingh	65	Rakesh	66	Neelkanth
66	Satyaprakash sharma	65	Maheshkumar	66	Jangluram	67	Vediya
67	Pawan Nishad	66	Ishwarram	67	Puranlal	68	Raji
68	Bhagvati Nishad	67	Ghanaram	68	Ramadhar	69	Kunti
69	Hiralal Nishad	68	Bisahat	69	Melaram	70	Ramu Patel
70	Jiram Nishad	69	Aanandram	70	Chandresh	71	Teeju
71	Mehattar Yadav	70	Rewaram	71	Basant Sahu	72	Devseer
72	Manohar Nishad	71	Ashwanikumar	72	Bavan Lodhi	73	Rajesh
73	Bhagvat Dewangan	72	Bhagiratisahu	73	Daolatram	74	Kumaru
74	Kanhaiya Dewangan	73	Satrughanlal	74	Prashant Vaishnav	75	Dayawati
75	Jagdish Dewangan	74	Ramkhilawan	75	Darvari Lodhi	76	Shailendra
76	Hetram Nishad	75	Murli Yadav	76	Sitaram	77	Kala Bai
77	Paras Nishad	76	Sukhitram	77	Jagaturam	78	Radha
78	Santosh Nishad	77	Parasnath	78	Dhiram Veram	79	Pheerat
79	Chhedu Yadav	78	Padum Lal	79	Bhaktram	80	Rakesh Gond
80	Kumbhkarn Vish'karma	79	Adhan	80	Pusau Mandavi	81	Sawana Markam
81	Agnibai Nishad	80	Ramesh	81	Amerika Bai	82	Prakash
82	Kewarabai Nishad	81	PanchRamDewangan	82	Fagguram Verma	83	Santosh Ghariya
83	Nemeshwar Nishad	82	Bhagwat Ram	83	Bhalkham	84	Bala Nath
84	Kuleshwar Nishad	83	Rohit Kumar	84	Shriram Sahu	85	Dashelal
85	Hirderam Nishad	84	Teekaram	85	Kokila Vaishnav	86	Inahani
86	Manohar Nishad	85	Chhanulal	86	Pokhanlal Sahu	87	Satkhaja
87	Ashok Yadav	86	Chandrika	87	Vamanram Lodhi	88	Ishwari Ghariya
88	Mohan Nishad	87	Vasnshilal	88	Chainsingh Verma	89	Sangeeta
89	Ramratan Yadav	88	Devaki	89	Bhikhuram	90	Ramavatar
90	Manvishram Yadav	89	Ramsay	90	Jahurram Netam	91	Tilak
91	Lakhan Nishad	90	Santos	91	Gopal Yadav	92	Naresh
92	Domar Nishad	91	Dwarika	92	Satish	93	Chameli
93	Sadaram Nishad	92	Revaram	93	Narayan Verma	94	Sohan Nath
94	Dupsingh Dewangan	93	Tomanlal	94	Dhirajiram	95	Omkar Yogi
95	Hirabai Shyamratan	94	Ramkumar	95	Rikhiram	96	Aanjani
96	Lakhan Satnami		**Bamhni**	96	Basudev	97	Gokaran Nath
97	Nandu Ramsewak	95	Bhuvanlal sahu	97	Jivan	98	Bhoga Bai
98	Bhagchand Phuldas	96	Pyari	98	Bhupendra	99	Gauri
99	Khulan Bhagchand	97	Leeladhar Patel	99	Shankar Mandavi	100	Binda

100	Dilip Bhagchand	98	Omkar Sahu	100	Satish Verma	101	Pushpa Soni
101	Thaneswar Bhagchand	99	Kailash kumar	101	Khubchand	102	Churan
102	Harishchandra Samaru	100	Sanjay Sahu	102	Ishvarram	103	Bhukhan
103	Panchram Kripal	101	Narad Sahu	103	Itwari Sahu	104	Hukmi
104	Mulchand Ramdas	102	Santram Sahu	104	Nankuram	105	Kumar
105	Premdas Ramdas	103	Itwari		**Kanhardabari**	106	Shanti Sen
106	Haridas Ramdas	104	Domar Yadav	105	Mannuram	107	Shukla
107	Ramdas Kolhu	105	Chova Nisad	106	Trivendra kumar	108	Kali
108	Amol Ramsay	106	Gulabchand Patel	107	Chovaram	109	Ramdeen
109	Muktidas Ramdayal	107	Nandram	108	Pankaj Verma	110	Sumitra
110	Hiradas Nathu	1-8	Moti Patel	109	Dhansingh	111	Chirekha
111	Mangaldas Chunu	109	Budharu Sahu	110	Janaklal		**Gulalpur**
112	Tirith Khorbahara	110	Krishnakumar	111	Chintaram	112	Phirtu Jaiswal
113	Puran Mangala	111	Tejram Sahu	112	Sudama	113	Krishna Jaiswal
114	Netram Mangala	112	Shreeram	113	Ramgulal	114	Vishnu Goshwami
115	Hemant Amol	113	Baburam	114	Manohar	115	Bahal Sahu
116	Budharu Boru	114	Rajendra Patel	115	Latturam	116	Ganesh Jaiswal
117	Chhatrapal Bhagirati	115	Budharu Nisad	116	Unmedram	117	Govind Jaiswal
118	Samaru Borau	116	Kartik Sahu	117	Brajlal Yadav	118	Sukhdev Patel
119	Ganesh Ramsewak	117	Chetan Thakur	118	Bharat Ram	119	Punnu Patel
120	Bhawarsingh Mehattar	118	Kuleshar Nisad	119	Chainram Verma	120	Genda Jaiswal
121	Bhaulal Chunu	119	Mohit Patel	120	Yugal kumar	121	Satrughan Sahu
122	Tesulal Bikai	120	Ghanshyam Thakur	121	Purshottam	122	Khelan Markam
123	Mangala Basawan	121	Toman	122	Tekchand	123	Dharmendra Sahu
	Padabhat	122	Mehatou	123	Chottelal Sahu	124	Jangliha
124	Suresh Verma	123	Pancho Bai	124	Ugrasen	125	Rohit Jaiswal
125	Paklu Verma	124	Jainu Sahu	125	Dhanukram	126	Jaleshwar
126	Dhansingh Verma	125	Parasram	126	Radhelal	127	Pheeran
127	Doman Bandhe	126	Duarika	127	Phoolchand	128	Urwashi
128	Shiv Verma	127	Tika Patel	128	Dayaluram	129	Narayan Jaiswal
129	Rupendra Bhatt	128	Vichardas	129	Fakirchand Sahu		**Mainpuri**
130	Bharat Verma	129	Tejan	130	Chandra Kumar	130	Dukhiram
131	Shyamlal Verma	130	Ramjee	131	Tapchand Verma	131	Suresh Kumar
132	Vijay Verma	131	Hemu Patel	132	Pooranlal	132	Kushal
133	Panch Verma	132	Ameit	133	Sukaluram	133	Shiv Prasad
134	Raju(Jakla) Verma	133	Neelkanth	134	Khemlal Sahu	134	Ramvatar
135	Ganesh Verma	134	Ankalu	135	Hemant Kumar	135	Santosh
136	Shyamratan Verma	135	Gaindkumar	136	Prakash Verma	136	Chunnu Ram
	Budera	136	Teekam	137	Trilok	137	Manuram
137	Dhelabai	137	Kunjlal	138	Lekhram	138	Satrughan Patel
138	Shantibai	138	Omkar	139	Ramchandra Verma	139	Rameshwar Patel
139	Bhagvat/Dhelu Narang	139	Gobind	140	Kush Yadav	140	Kumlal Patel
140	Manoj / Dhelu Narang	140	Domu Patel	141	Veersingh	141	Sohan Lal
141	Dhelu Narang	141	Bhuvendra	142	Mahaveer	142	Tihari Ram Patel
142	Virendra Sahu	142	Tiharuram	143	Goverdhan	143	Parasu Ram Patel
143	Bhuvanlal Sahu	143	Dayaram	144	Ghaneshwar	144	Singhau Patel
144	Jhabbulal sahu	144	Kailash		**Teka Hardi**	145	Panchbhaiya Patel
145	Jeevnath sahu		**Deori**	145	Nandlal	146	Rajeram Patel
146	Punitram Satnami	145	Geshwar Sahu	146	Manharan	147	Chande Ram Patel
147	Sarjuram Sahu	146	Rikhi	147	Birendrasingh	148	Ganpat Patel
148	Ashok Sahu	147	Khumman	148	Rajkumar	149	Krishna Ram Patel
149	Lakhan Sahu	148	Kartik	149	Amanlal	150	Naresh Ram Patel
150	Jayant sahu	149	Umesh	150	Bhuneshwar	151	Dhunari Ram Patel
151	Mahendra sahu	150	Pasou	151	Amula Bai	152	Siya Ram Patel
152	Mohanlal sahu	151	Khilavan	152	Samarin Bai	153	Tilak Ram Sahu

153	Nandkumar Sahu	152	Hariram	153	Sivbalak	154	Dongar Patel
154	Rajkumar sahu	153	Goutambai	154	Manisha	155	Daleshwar Patel
155	Maniram sahu	154	Tulendra	155	Nohar Verma	156	Jagdev Patel
156	Bhurava Sinha	155	Sharad	156	Shukhiyaran	157	Phulel Ram Patel
157	Jagrakhan Dhivar	156	Rajesh	157	Mayaram	158	Posagi Sahu
158	Manoj Dhivar	157	Khumendra kumar	158	Madhulata	159	Basdev Patel
159	Vishnu Dhivar	158	Sadhuram	159	Amulram	160	Vanwali Patel
160	Narayan Yadav	159	Goutam	160	Bhagvat Nishad	161	Gautariha Patel
161	Rajkumar Yadav	160	Budhyaribai	161	Agnu	162	Lal singh Patel
162	Santosh Yadav	161	Bhukhan Yadav	162	Pritamsingh	163	Chatur ram Patel
163	Pokiram Yadav	162	Babulal	163	Chetan	164	Dasau Ram Patel
164	Kanhaiyalal Sahu	163	Naresh Sahu	164	Raju	165	Yashwant
165	Harilal Sahu	164	Halalkhor	165	Bindu Bai	166	Sidhelal Patel
166	Yashvant sahu	165	Poshan	166	Vishram	167	Sant Ram Patel
167	Budhram Sahu	166	Sitaram	167	Yogendra singh	168	Anand Ram
168	Radheshyam	167	Santosh	168	Kamlesh Singh	169	Heeraram Patel
169	Bharat Yadav.	168	Raju	169	Shambhu Verma	170	Rajkumar Patel
170	Maniram sahu.	169	Lakshman	170	Tikam Singh	171	Pherha Patel
171	Rajkumar Sahu.	170	Bhajan	171	Mohandas	172	Shankar Patel
172	Ganeshram Sahu.	171	Rekhram	172	Toman Verma	173	Bishnath Patel
173	Smt. Bodhinbai Sahu.	172	Domar	173	Devnandan	174	Netram Patel
174	Radheshyam	173	Jainarayan		**Bhanpuri**	175	Jagau Ram Patel
175	Lochan Prasad Sahu.	174	Mayaram	174	Dasharath Prasad	176	Lala Ram Patel
176	Gokul Yadav.	175	Gangaprasad	175	Derharam	177	Jagdev Sahu
	Beldar Seoni	176	Alakh Ram	176	Chandresh	178	Nawal Ram Patel
177	Ramanuj Verma	177	Shukhma	177	Tameshar	179	Visambhar
178	Kailash Verma	178	Chabilal	178	Sagar	180	Bishu Ram Patel
179	Pannlal Verma	179	Sarju Ram	179	Bhunesh	181	M. Shankar Sharma
180	Thakur Ram Verma	180	Visu	180	Gurhar	182	Kaushal Sahu
181	Salikram Verma	181	Amarsingh	181	Purshottam	183	Komal Ram Sahu
182	Mahesh Verma	182	Kheman	182	Madhu Verma	184	Netram Patel
183	Ganeshram Verma	183	Ramesh	183	Ishwar	185	Vanshi Lal Patel
184	Umendra Sinh Beldar	184	Krishnaram	184	Dharam	186	Rajesh Gupta
185	Tulsi Ram Verma	185	Balaram	185	Krishna	187	Lala Ram Shrivas
186	Sahdev Verma	186	Kawal	186	Motilal	188	Ghadu Ram
187	Bisauha Verma	187	Chummandas	187	Purshottam	189	Janati Ram
188	Mantram Dhivar	188	Bodhray	188	Heerawal	190	Krishna Ram Dhurve
189	Shivkumar Verma	189	Kritkumar	189	Derha	191	Neelkanth Dhurve
190	Biharilal Verma	190	Nilkanth	190	Shersing	192	Bishnath Patel
191	Rajendra Verma	191	Gainduram	191	Bihari	193	Aliyar
192	Ramavtar Verma	192	Chhaganlal	192	Baijuram	194	Jaguram
193	Lekhram Verma	193	Santosh	193	Bhanu	195	Sukhdev Dhurve
194	Mahendra Verma	194	Durgesh Thakur	194	Bharat	196	Ramchandra Dhurve
195	Parasram Verma	195	Rohit	195	Ramgulal	197	Shiv Charan
196	Bhushan Verma	196	Naresh Kumar	196	Sonsay	198	Mehtar Patel
197	Ramkumar Satnami	197	Deeraj	197	Khemlal	199	Jaganath Dhurve
198	Punitram Satnami	198	Hemeen	198	Santsahu	200	Jagdeesh
199	Dinesh kumar Verma	199	Khurbahera	199	Gayaram	201	Ganesh Patel
200	Shivshankar Verma	200	Khumman	200	Itwari	202	Jeevan Sahu
201	Shantibai Verma	201	Yogendra	201	Bharat	203	Sanwan Dhurve
202	Nandkumar Verma	202	Ramkuwar	202	Tulsiram	204	Mahajan Patel
203	Saraj kumar Verma	203	Kamal	203	Haran	205	Sidhau Patel
204	Jivanlal Verma	204	Amarsingh	204	Jaysingh	206	Nedu Ram Dhurve
205	Kisun Verma	205	Sukhit	205	Dularu		**Chandeni**
206	Motiram Verma	206	Kallu	206	Judan	207	Gaya Ram

207	Kartik Ram Verma	207	Bhekhram	207	Ramgopal	208	Itwari
208	Shatrughan Verma	208	Deenu	208	Rajkumar	209	Nanaku Das
209	Babulal Mehar	209	Jwala	209	Savant	210	Sahali
210	Dayaram Dhivar	210	Mahetrin	210	Jagat	211	Bahal Ram
211	Gopal Verma	211	Dilip	211	Pyarelal	212	Ghanshyam
212	Krishankumar Verma	212	Nohar	212	Toran	213	Shivshankar
213	Sevaksingh Sahu	213	Angkarak Deshmukh	213	Uttam Sahu	214	Subhadra Dubey
214	Ramadhar Beldar	214	Dasau Nishad	214	Uttam Satnami	215	Rohit Chandrawanshi
215	Krishankumar Verma	215	Bahursingh	215	Sukhlal	216	Rajendra Kumar
216	Ramprakash Beldar	216	Rambai	216	Jageshar	217	Susheela
217	Rameshkumar Verma	217	Gendlal	217	Ramdayal	218	Binda Bai
218	Ramadhar Verma	218	Vishram	218	Gopiram	219	Satrughan
219	Ramkumar Verma	219	Netram	219	Shankar Verma	220	Dukaru Ram
220	Chovaram Dhivar	220	Santosh	220	Komal	221	Rohit
221	Chhannulal Patel	221	Mahettar	221	Jayram	222	Ram Chandra
	Farhada	222	Meelap	222	Heeralal Verma	223	Premlal
222	S. Balbhadra Chandrakr	223	Seetaram	223	Narayan Verma	224	Kamata
223	B. Gokul Chandrakar	224	Adau	224	Rameshar	225	Ramesh Yadaw
224	Arvind Ashok Chandrakar	225	Hinsha	225	Kesho Yadav	226	Ishwar Das
225	Adarsh Ashok Chandrakar	226	Gendibai	226	Poshanram	227	Chandu
226	D. Shiyaram Chandrakar	227	Khumman	227	Punaram	228	Sant Ram
227	Janak siyaram Chandrakar	228	Ganesh	228	Mahesh	229	Hari Kirtan
228	Bisauha Samodi sahu	229	Bahur	229	Kapil	230	Ghasi Ram
229	Shyamlal Bakhariya Sahu	230	Hema	230	Ramnath Verma	231	Budhari
230	Anil Dwarika Satnami	231	Roshan	231	Shatrughan verma	232	Nand Kumar Porte
231	Narendra Dwarka Satnami	232	Prema	232	Devlal	233	Heera Singh Porte
232	Kanhaiya Bhuwan Sahu	233	Dwarika	233	Dhansay Sahu	234	Dev Nath
233	Ghanshyam Manglu Sahu	234	Yuaraj	234	Mangaldas	235	Gend Lal
234	Yogesh Kumar Chandrakar	235	Patiram	235	Kusum	236	Alakhu Ram
235	S. Girdhari Ch’drakar	236	Indrakumar	236	Balgovind	237	Raspal Singh
236	Ramdayal Nirdin sahu	237	Kheduram	237	Kamlabai	238	Brahma Ram
237	Ramdhan Nirdin sahu	238	Hemant	238	Khorbehra	239	Hulas
238	Ramshila Laxman Ch’drakar	239	Unmedi	239	Ramshrkhar	240	Ganpat Ram
239	Vishnu Jivrakhan Sahu	240	Kuleshwar	240	Makhan	241	Susheel
240	Hemant Bisauha Kannoje	241	Bhagvanram	241	Kushalram	242	Utara
241	Ramesh Khedram Yadav	242	Mahaveer	242	Koushal	243	Vijay
242	Santosh Yadav	243	Budheram	243	Mathuraprasad	244	Narsingh
243	Jagat Yadav	244	Somnath	244	Punaram	245	Manak Das
244	Kodu Jagat Yadav	245	Puranik	245	Tameshar	246	Susheel Chadrawansi
245	Paras Chadrakar	246	Mansingh	246	Shayamlal	247	Sadhawa
246	Ghanshyam Chandrakar	247	Bhuvan	247	Vishunu	248	Prem Lal
247	Pawan Chandrakar	248	Chinta	248	Dayaluram	249	Mahesh
248	Mehattar Sahu					250	Rajendra Kumar
249	Jagdish Chandrakar						
250	Neel Kannoje						

State: Madhya Pradesh

S. No	District: jabalpur	S. No	District: Damoh	S. No	District: Rewa	S. No	District: Satana
	Name of farmers/Village		**Name of farmers/Village**		**Name of farmers/Village**		**Name of farmers/Village**
	Kingi		**Hardua Mudar**		**Kapsa**		**Karhaikala**
1	Naresh Patel	1	Kodu singh	1	Deepak Tiwari	1	Chote Lal Singh
2	Shiv Patel	2	Bhagun singh	2	Rishi Tiwari	2	Hera Lal
3	Gopal Patel	3	Uday singh	3	Rakesh Tiwari	3	Ram kumar Singh
4	Pramod Patel	4	Gulab singh	4	Bheemsen Tiwari	4	Chakauri Lal Singh
5	Arjun Patel	5	Sandesh pathak	5	Chakradhar Tiwari	5	Kashi Deen Singh
6	Brijesh patel	6	Munni bai pathak	6	Abhiman Tiwari	6	Satya Bhan Singh
7	Sanjesh Patel	7	Chote singh	7	Krishinandan Tiwari	7	Rameshwar Singh
8	Kaloo Patel	8	Nijam Singh	8	Roopnarayan Tiwari	8	Uday Bhan Singh
9	Mannu Patel	9	Tatu sen	9	Jyotiprakash Tiwari	9	Ram Charan Singh
10	Kishan Patel	10	Shankar singh	10	Mahendra pandey	10	Shayam Lal
11	Nagendra Patel	11	Mulayam singh	11	Shantinarayan Pandey	11	Ram Kalesh Singh
12	Mahesh Patel	12	Giran singh	12	Suresh Tiwari	12	Jagat Dhari Singh
13	Dilip Patel	13	Dan singh	13	Hiralal Tiwari	13	Jai Singh
14	Vinod Patel	14	Vipda bai	14	Munendra Tiwari	14	Jamuna Singh
15	Ganesh soni	15	Pancham singh	15	Garuddhwaj Tiwari	15	Dinesh Tiwari
	Tikariya	16	Khillu	16	Ram Tiwari	16	Mahendra Singh
16	Kamlesh yadav	17	Ratan	17	shivKumar Tiwari	17	Ram Nath Singh
17	Kailash yadav	18	Ravi	18	Santosh Tiwari	18	Mahipal Singh
18	Ram Prasad Oyam	19	Tej Kumari	19	Choora mani Tiwari	19	Arun K Dvivedi
19	Parvati bai Yadav	20	Rajesh	20	Shyamdhar Tiwari	20	Yogendra Singh
20	Mangi Lal Saiyam	21	Babulal	21	Kamleshvar Tiwari		**Bairahatola**
21	Kihar singh	22	Than singh	22	Gopalsharn Tiwari	21	Ram Khilavan Patel
22	Punnu singh	23	Seetaram	23	Gewardhari Tiwari	22	Rajesh Patel
23	Mulayamlal Yadav	24	Jeevan	24	Shomesh Tiwari	23	Sant Kumar
24	Komal singh	25	Hariprasad	25	Banshidhar Tiwari	24	Lakhanlal Patel
25	Mukesh yadav	26	Jwala Prasad	26	Anupam Pandey	25	Maiyyadin Patel
26	Harishchand yadav	27	Mukesh	27	Ganga Prasad Pandey	26	Kedar P Patel
	kandiya	28	Laxmi Prasad	28	Ashok Tiwari	27	Badri Prasad
27	Munna Singh Maravi	29	Narayan singh	29	Mankamana Soni	28	Sateesh Patel
28	Devi singh maravi	30	Amara Bai	30	Madhu Tiwari	29	Ramesh Patel
29	Mukesh singh maravi	31	Omprakash	31	Umesh Tiwari	30	Ram Sakha Patel
30	Phool bai maravi	32	Hukumsingh	32	Sanjay Tiwari	31	Raj Kumari
31	Dhan singh	33	Kalyan singh	33	Kamla Tiwari	32	Katahur Patel
32	Shiv narayan	34	Kishore singh	34	Aniruddha Tiwari	33	Ayodhya Patel
33	Teto bai singh	35	Latori	35	Pappu Tiwari	34	Gokul Patel
34	Sukhiya bai	36	Jagat singh	36	Sanjesh Tiwari	35	Deen Bandhu
	Kaladomer	37	Rohit singh	37	Keshmani Tiwari	36	Ramkishore Chaudhri
35	Sanjay Tiwari	38	Kaluram	38	Chandrabhusan	37	Daduram Sen

					Tiwari		
36	Sukhdev Prasad	39	Mayabai	39	Umesh Tiwari	38	Prahlad Patel
37	Manmohan Tiwari	40	Munna	40	Bheem Tiwari		**Gobrawkhurd**
38	Mula tiwari	41	Hari singh/dheeraj	41	Deepu Tiwari	39	Mahipal Singh
	Jatna	42	Hari singh /Kamod	42	Umashanker Tiwari	40	Gajendra Singh
39	Sunil Patel	43	Gunthai/dhansingh	43	Jeetendra Tiwari	41	Darbari Lal Singh
40	Arvind patel	44	Natthu/Chetu	44	Ramlakhan Tiwari	42	Vijay Bhan Singh
41	Arti Patel	45	Lacchu singh	45	Indrajeet Tiwari	43	Heera Singh
42	Ram Kumari patel	46	Jeevan/Hosiyar	46	Shankhdutt Tiwari	44	Pushpa Singh
43	Ajad patel	47	Mullu singh	47	Sarkar bahadur Tiwari	45	Ajeet Singh
	Bhidarikala	48	Pyare singh	48	Sanat Tiwari	46	Ravendra Singh
44	Balaram shahu	49	Bhairo	49	Ambika Tiwari	47	Avadh Bihari
45	Mahendra Patel	50	Munna/malkhan	50	Prampd Tiwari	48	Raj Kishore Singh
46	Vinod Patel	51	Param/Ghinnu	51	Sushil Tiwari	49	Virendra Singh
47	Vinay Patel	52	Bhagvat Prasad	52	Sarasnath pandey	50	Swamideen Singh
48	Jagdev Patel	53	Dhan singh	53	Fadhindra Pandey	51	Rajendra Singh
49	Daduram Vishwakarma	54	Ashok/raghuvar P khare	54	Satyadhar Tiwari	52	Bhupendra Singh
50	Sonu vishwakarma	55	Puran singh/Phulan s		**Amrah**	53	Avdhesh Singh
51	Indra K patel	56	Lakhan singh	55	Nagendra Singh	54	Ram GopalSingh
52	Mannu Patel	57	Nizam singh	56	Rajpal Singh	55	Kiran Singh
53	Jagmohan Patel		**Banwar**	57	Ramgopal Singh	56	Baijnath Singh
54	Umakant Patel	58	Param singh	58	Shivsanker Singh	57	Ranjit Singh
55	Harikant Patel	59	Girvar singh	59	Ramasaray Singh	58	Raj Bahadur Singh
56	Shriram Milan Patel	60	Badri singh	60	Mangal Singh	59	Ram Milan Singh
57	Bhola Patel	61	Subhash/bhagchand	61	Ramkaran Singh	60	Muner Singh
58	Takchand Patel	62	Awadhrani	62	Ramlal Singh	61	Sukhendra Singh
	Kohna & kohni	63	Jahar singh	63	Indrajeet Singh	62	Arun Pratap Singh
59	Raj kumar patel	64	Raju singh	64	Manbahoran Singh	63	Kamleshvar Singh
60	Anil Patel	65	Ashish kumar	65	Rajmaan Singh		**Khoh**
61	Ramdas Patel	66	Dharma singh	66	Jairam singh	64	Badri s/oRamBahor
62	Krishna Kumar Patel	67	Rakesh	67	Lalesh Singh	65	Ram Suhavan
63	Bharti lal Patel	68	Nanna/punna	68	Ramashray Singh	66	Bhaiyya Lal Mallah
64	Kaptan Patel	69	Santosh/Babulal	69	Hemraj Singh	67	Ram Kalesh Mallah
65	Chote lal Patel	70	Saachin/santosh	70	Ajaybhan Singh	68	Shankar Lal Kewat
66	Baldev Patel	71	Vijayrani	71	Ramgopal Singh	69	Sambhu Kewat
67	Atul Patel	72	Ratanchand	72	Vijaybhan Singh	70	Ajeet Lal Kewat
68	Indra kumar Patel	73	Laxmichand	73	Jaibahadur Singh	71	Sahdev
69	Sushil Patel	74	Halke singh/natthu	74	Pushpendra Singh	72	Dev Lal Mallah
70	Dalansah Patel	75	Laxman singh	75	Bhupendra singh	73	Kaushal
71	Chandi lal Patel	76	Komal singh	76	Amar Singh	74	Swamidin
72	Niraj Patel	77	Pappu/chatu	77	Dharmendra Singh	75	Babloo Prasad
73	Gopal Prasad Patel	78	Nannibai/ballelal	78	Ramsumiran singh	76	Lok Nath
74	Jugalkishore Patel	79	Gudda/chetushahu	79	Ganesh dwivedi	77	Prem Lal
75	Chotelal Patel	80	Nanhebai/chetu	80	Govind Singh	78	Sunder Lal
76	Hari lal Patel	81	Vinod kumar	81	Ramkishore Singh	79	Ram VishvasYadav

	Bheta	82	Pappu/komalchand	82	Santosh Singh	80	Ram Raj Yadav
77	Ashok Patel	83	Bhagirath	83	Ram singh	81	Ram Daras Yadav
78	Sanjay Patel	84	Magan/tegilal	84	Gajendra Singh	82	Noor Mohammad
79	Ganga ram Patel	85	Santosh kumar	85	saket Singh	83	Rajman Prajapati
80	Ashok sen	86	Bhopalsingh	86	Rammanohar Singh	84	Laxman
81	Sonelal	87	Laxaman singh	87	Kamlesh Patel	85	Kamlesh
82	Annu Patel	88	Narayan singh	88	Hiralal Patel	86	Dalveer
83	Sevak Patel	89	Ravikumar	89	Mukundmurari Patel	87	Viran
84	Virendra Patel	90	Surendra kumar	90	Ramkishore Singh	88	Rajesh K Kewat
85	Mahendra Patel	91	Omprakash	91	Indramani Patel		**Bandarah**
86	Ishwar Patel	92	Poona bai	92	Ramkumar patel	89	Prahlad Singh
87	Anil Patel	93	Ajaitsingh/lallusingh	93	Vishnu Patel	90	Pratap Singh
88	Rajendra Patel	94	Devisingh/lallusingh	94	Satish Singh	91	Munni Singh
89	Kallu Patel	95	Surendra singh	95	Arjun Patel	92	Vishvanath Singh
90	Gyani Patel	96	Ravikumar/shikhar		**Sir-1**	93	Arjun Singh
91	Balwant Giri	97	Subhash chand	96	Kamta Awasthi	94	Ram Das Singh
92	Dilip Patel	98	Pradeep/sikharchand	97	Jeevan sharan Awasthi	95	Sunder Lal (Kotwar)
93	Ramadhar patel	99	Sunil/mahendra	98	Mohan Awasthi	96	Bhim Singh
94	Kipal Patel	100	Mahendr kumar/shobharam	99	Gyandutt Awasthi	97	Ram Bahori
95	Ramsaran Pate	101	Kelash/kanhiya	100	Sunil Awasthi	98	Jay Singh
96	Rakesh Patel	102	Sundeep/mahendra	101	Sanjeev Awasthi	99	Lalli Singh
	Chati	103	Vimal kumar	102	Rajeev Awasthi	100	Ram Pal Singh
97	Ram krishna Patel	104	Shenki/santoshkuma	103	Akhileswar Awasthi	101	Samarjeet Singh
98	Indra akumar patel	105	Ramsingh	104	Yogendra Awasthi	102	GirvarSingh
99	Naresh Patel	106	Rajesh/ramsingh	105	Mandvi Awasthi	103	Omesh Singh
100	Kailash Patel	107	Devendra singh	106	Samay Prasad Awasthi	104	Ram Niranjan
101	Janki Patel	108	Mitthusingh	107	Gopal Awasthi	105	Ram Sajevan
102	Tikaram Patel	109	Sone singh	108	Ganesh Awasthi	106	Narendra Singh
103	SudamJhariya	110	Ramshankar/natthu	109	Dulara Awasthi	107	Mishri Singh
104	Vidhaya bai	111	Nizamsingh/nirpat	110	Badrinath Awasthi	108	Kalyan Singh
105	Premkumar Dixit	112	Khemabai/ghoman	111	rajnarayan Awasthi	109	Mahipal Singh
106	Guru Patel	113	Kallusingh	112	Ramkhelawan Singh	110	Shayam Lal
107	Virju Pradhan	114	Dansingh	113	Arvind Awasthi	111	Chote Singh
108	Rupchand Dixit	115	Balramdube	114	Keshv Awasthi	112	Kamlesh Singh
109	Narayan Dixit	116	Saughand/rakeshjain	115	Atul Awasthi	113	Ram Narayan
110	Arti Dixit	117	Daryabsingh	116	Pamlak Awasthi	114	Ramesh Singh
111	Shambhudayal Jhariya	118	Jamna Prasad	117	Piyush Awasthi	115	Sunder Singh S
112	Surdershan Jhariya	119	Shankarsingh	118	Manish Awasthi	116	Sarjoo Prasad
113	Indrabai Jhariya	120	Khet singh	119	rajmani Awasthi	117	Naththu Prasad
114	Pankaj Jhariya	121	Jhalkan singh	120	Krishnagopal Upadhyay	118	Shayam Lal
115	Surendra Jhariya	122	Lacchu/Pyare	121	Vinod Upadhyay		**Lahraura**
116	Shiv charan jhariuya	123	Tundibai/kalyansing	122	Baidhnath Upadhyay	119	Rakresh K Pandey
117	Saroj jhariya	124	Kalyansingh/dalchan	123	Shreelalman Upadhyay	120	Raj Kumar Pandey
118	Vinay jhariya	125	Sethlal/halku	124	Ramgopal Upadhyay	121	Shalendra Pratap Singh
119	Mukesh Patel	126	Lallu/sethlal	125	Rajendra Awasthi	122	Vijay Kumar Tripathi

120	Vinay k kori	127	Veerendra/nandulal	126	Rajswar Awasthi	123	Ashoke Kumar Dwivedi
121	Ram singh	128	Kamalkishor	127	Jeetendra Awasthi	124	Arun Dwivedi
122	Ranjana Patel	129	Karan/kaluram	128	Prakash Awasthi	125	Sampat Bai / Prahlad
123	Manoj chaubey	130	Baliram/karan	129	Raghuvar Awasthi	126	Kushuma
124	Chandrika P Tiwari	131	Hariram/kaluram	130	Ravi singh	127	Dharmendra Datt Garg
125	Vikash dubey	132	Munna/muradkhan	131	Roopesh singh	128	Ramesh Tiwari
126	Sitaram patel	133	Rafik/muradkhan	132	Ramnaresh Upadhyay	129	Krishna Bihari Pandey
	Singrod	134	Poonabai/bhagun	133	Motilal Upadhyay	130	Balendra Kumar Garg
127	Rajkumar Patel	135	Dayaram/sarjuprasa	134	Dinesh Upadhyay	131	Pradeep Narayana Tiwari
128	Sonelal Patel	136	Babusingh	135	Ramsurat Upadhyay	132	Shayama Devi
129	Chbelal Patel	137	Babulal/latora	136	Ramesh singh	133	Rajan Pandey
130	Ramvishal Patel	138	Dayaram/kanshi	137	Ramkumar singh	134	Vishwanath Dahayak
131	Ramlal patel	139	Bhagchand	138	Ramesh sharma	135	Rajesh Dwivedi
132	Greesh Kumar	140	Bharat/nannu	139	Shushila dwivedi	136	Dharmendra Singh
133	Asha Patel	141	Paramsingh/sukke	140	Devendra awasthi	137	Ayodhya P Rajak
134	Harish chand Patel	142	Suryaprakash/paramsingh	141	Nageswar Upadhyay	138	Shayam Bihari Pandey
135	Premchand Patel	143	Puspendra/param Singh	142	Ramkripal Upadhyay	139	Pradeep KumarTripathi
136	Ayodhaya P Patel	144	Laxman/girvarsingh	143	Nagendra Upadhyay	140	Brijesh KumarUrmaliya
137	Himmabai patel	145	Padamsingh	144	Rakesh Upadhyay	141	Sharda Dahayak
138	Ram Kant	146	Premchand	145	Sunil Upadhyay	142	Malayya S/o Shahanya
139	Kusum bai	147	Manoharlal	146	Dharmendra Upadhyay	143	Anil Kumar Pandey
140	Ramkesh Patel	148	Khuman/parsadi	147	Rammani Awasthi	144	Rajjan K Pandey
141	Laxminarayan Patel	149	Subhash/latorelal	148	Shambhu awasthi	145	Tej Baali Tiwari
142	Halke Lodhi	150	Narayanprasad	149	Sangesh awasthi	146	Irshad
143	Dilip Patel	151	Sunil kumar	150	Saivvardhan awasthi	147	Sayeed
144	Ganesh patel	152	Karan/kaluram	151	Ramsumiran patel		**Padkhuri**
145	Rakesh Patel	153	Hariram	152	Chotelal patel	148	Ram Sujan
146	Sanju Lodhi	154	Ramesh/laxmichand	153	Swroop patel	149	Balmik Kushwaha
147	Ashok patel	155	Kevalchand	154	Chotu tiwari	150	Brijwasi Kushwaha
148	Ajeet Patel	156	Gulab/siddha	155	Indralal awasthi	151	Harideen Kushwaha
149	Narendra Lodhi	157	Bhagna/tigiya	156	Rajbhoran dwivedi	152	Mahavir Kushwaha
150	Madan Patel	158	Ghasiya/chhota	157	Krishnakumar singh	153	Santosh Kushwaha
151	Indal Lodhi		**Larguvan**	158	Avdesh singh	154	Shayamlal Sahu
152	Maniram Lodhi	159	Bhagwan singh	159	Ramlal awasthi	155	Ram Vishvas Sahu
153	Shiv Prashad Lodhi	160	Shantibai/bhagwansingh	160	Mahendra singh	156	Shivlochan
154	Lata bai	161	Khilan singh	161	Surendra singh	157	Krisna S/o Kanta
155	Kodilal	162	Ashok kumar	162	Virendra singh	158	Shiv Prasad
156	Sita ram Lodhi	163	Jayvijaysingh	163	Devesh Awasthi	159	Lalu Prajapati
	Amadogri	164	Bhupat singh	164	Ramkripal singh	160	Narayan Prasad Pandey
157	Ram Kumar Patel	165	Charn singh	165	Shambhunath singh	161	Durga Prasad Soni
158	Vishram P Patel	166	Narbad singh		**Gophi**	162	Ram Chand
159	Ramkumar Patel	167	Laxman singh	166	Shyamlal Patel	163	Ram Dev
160	Dropti bai	168	Devi singh	167	Kaushal Patel	164	Ramashray Kushwaha
161	Santosh Kumar	169	Bhagunt singh	168	Munnalal Patel	165	Brijraj S/o Purusottam

162	Shyamlal Patel	170	Sahab singh	169	Bansprasad Patel	166	Shayam Lal Vishvakarma
163	Kaloram Patel	171	Ram singh	170	Bhagwandeen Patel	167	Shiv Kumar
164	Mamta Bai	172	Nannehe singh	171	Anusiyaprasad Patel	168	Brijendra Singh
165	Kiran Bai	173	Pamu/punna	172	Pannalal Patel	169	Ganesh P Pandey
166	Jitendra Patel	174	Mukand singh	173	indrabhan Patel		**Guduhru**
167	Amratlal	175	Hanumat singh	174	Pantlal Patel	170	Deshraj Prajapati
168	Sugreev Prasad	176	Balram/natthu	175	Gendelal Patel	171	Sukhuva Prajapati
169	Ashok kumar	177	Dan singh	176	Ramdhar Patel	172	Ram Nath Dahiya
170	Jagdish Prasad	178	Phool singh	177	Amritlal Patel	173	Ram Yash Kushwaha
171	Parvati bai	179	Kalian singh	178	Laxaman Patel	174	Bhom Pal Singh
172	Savita bai	180	Vitthal singh	179	Shayamlal Patel	175	Vishvanath Yadaw
173	Rekha bai	181	Kamal singh	180	Bisarjan Patel	176	MathuraPrasad Yadaw
174	Chameli bai	182	Deevan singh	181	Gayadeen Patel	177	Shiv Balak Kushwaha
175	Jai Karan	183	Narbad/pujari	182	Gyaprasad Patel	178	Umesh Kumar Agrawal
176	Sushil kumar	184	Sahab singh/babusingh	183	Ramkirat Patel		**Gara**
177	Umesh kumar patel	185	Kalyan singh/ramchandra	184	Mohan Patel	179	Jai Balak Singh
178	Sivkumari	186	Heeralal/Katua	185	Satte Patel	180	Shayam Sunder Singh
179	Keshar bai	187	Dharmchand/dalchand		**Doobaha**	181	Harideen Singh
180	Bachhubai	188	Roopsingh/gokal	186	Surendra Awasthi	182	Devkali Singh
181	Rajendra Prasad		**Hardua man**	187	Chotelal Upadhyay		**Barha**
182	Kishan lal	189	Gulab singh/Prahlad Singh	188	Aniol Chaturvedi	183	Keshaw Prasad Mishra
	Kodihara	190	Jagat singh/Gandharve Singh	189	Rajesh Shukla	184	Vishwanath Prasad Mishr
183	Bani Prasad yadav	191	Babu singh/Nanna	190	Yogendra Tiwari	185	Dinesh Prasad Mishra
184	Ramratan Yadav	192	Balvan/Mohan Singh	191	Yadunath Tiwari	186	Badri Kushwaha
185	Bihari lal patel	193	BalvanSingh/Ghuman	192	Munindra Awasthi	187	Shayam Sunder
186	Dinesh kumar Patel	194	Mangal Sin./Ghuman Singh	193	Subodh Awasthi	188	Mahendra Mishra
187	Jhaluram Patel	195	Raju Singh/Ranmat Sing	194	Lakhan Awasthi	189	Dharm Vijay Singh
188	Dhirendra Kumar Patel	196	Mohan Singh/Ranmat Singh	195	Premlal Awasthi	190	Indramani Mishra
189	Heera lal patel		**Pipariya**	196	Virendra Awasthi	191	Bhagvat Singh
190	Pramod kumar patel	197	Rajkumar/Kodulal	197	Anshuman chaturvedi	192	Ram Nath Kushwaha
191	Rambhagash Patel	198	Ramesh/Pooran	198	Mahendra chaturvedi	193	Rajeev lohchand
192	Champa bai Patel	199	Tara bai/Mohan Singh	199	Ramniwas Awasthi	194	Shayam Bihari Kushwaha
193	Amit kumar patel	200	Shanty bai/Durjan	200	Krishna kumar Awasthi	195	Vimla Singh Patel
194	Ramkishan barman	201	Radha bai/Nathu	201	vishambhar Awasthi		**Kotar**
195	Bhagwan das patel	202	Ramkumar/Kodulal	202	Badri Awasthi	196	Dinanath Gautam
196	Bhanu Prasad patel	203	Prem bai/Ramprasad	203	Diwaker Awasthi	197	Ram Bihari Singh
197	Satenara kumar patel	204	Ratiram/Jairam	204	Dinkar Awasthi	198	Madhav Singh
198	Avadh narayan patel	205	Kashiram/Janak	205	Deepak Awasthi	199	Mahipal Singh
199	Vajanti bai patel	206	Jankibai/ Harishanker	206	Ramlal Awasthi	200	Ayodhya Singh
200	Suman bai patel	207	Gyan bai/Govind	207	Rajesh Awasthi	201	Vijay Kumar Mishra
201	Visarati bai barman	208	Shreeram/Ganga chaube	208	Nagendra Tiwari	202	Indra Pal Singh
202	Vinod kumar patel	209	Bhuvani/Paramlal	209	Ranprasad Chaturvedi	203	Sharda Singh

203	Sanker lal patel	210	Harishanker/Ratiram	210	Rammurat Awasthi	204	Vijay Pal Singh
204	Hemlata bai	211	Ramesh/NarayanAhirwar		**Jagir**	205	Indrapal Singh
205	Girija bai	212	Balmukund/Nannhe	211	Bhanuja Prasad Tiwari	206	Tej Bali Singh S
206	Ram sujan Patel	213	Saroj bai/Raju	212	Rajendra Prasad Tiwari	207	Badri P Mishra
207	Ramdas Patel	214	Santosh/Kashiram	213	Gaya Prasad Tiwari	208	Rakesh K Mishra
208	Indal P patel	215	Matthu/Kodulal	214	Dwarik Prasad Tiwari	209	Shivmurat Shukla S
209	Gulmansha bai	216	Malti bai/Santosh Kumar	215	Ajay diwivedi	210	Chandrika Prasad Payasi
210	Radha bai patel	217	Jawahar/Mauji shahu	216	Sudahana Prasad Tiwari	211	Ram Naresh Singh
211	Anurag patel	218	Mahendra/Motilal Jaiswal	217	Krishna Murari Tiwari	212	Manbharan P Mishra
212	Maya bai patel	219	Nand Kishor/Azuddi singh	218	Awdhesh gupta	213	Kamta P Pandey
213	Laximi bai patel	220	Jagdishsingh/Bhubal singh	219	Shailendra Tiwari	214	Budhasen Kewat
214	Vijay kumar	221	Babulal/Kishori	220	Jaideep dwivedi	215	Ram Bali Singh
215	Ramnath	222	Sahodara bai/Lalchand	221	shrikant Tiwari		**Maad**
216	Kamlesh Prasad	223	Premshanker/Kishori	222	Nawal kishor Tiwari	216	Ram Samani Kewat
217	Tara chand	224	Ashok/Azuddi	223	Manveshar Sahu	217	Om Prakash Shukla
218	Hisabi lal patel	225	PremNarayan/Kishori	224	Jeetendra Tiwari	218	Sudhir S/o Ram Pratap
219	Mushkilal	226	Trivani/Nandkishor	225	Dinesh dwivedi	219	Shivam Shukla
220	Hitendra kumar	227	Haridas/shyamlal	226	Hemant Tiwari	220	Shiv Shankar Gautam
221	Vikesh kumar	228	Maltibai/Jawaharlal	227	Janki Tiwari	221	Alakh Nanda S
222	Basant kumar patel	229	Kallu/ Rajaram	228	Jagdish tiwari	222	Vishnu
223	Ramji lal	230	Basant/Heeralal	229	Ramkishore Tiwari	223	Ramanand
224	Arti bai yadav	231	Pravat/Hariram	230	Anil Tiwari	224	Ram Milan
	Banderkola	232	Surendara/Dayaram	231	Shyam kishore Tiwari	225	Munna S/o Manfer
225	Halke singh	233	Harvendra/Dayaram	232	Pramod Tiwari	226	Dhiraj S/o Chakauri
226	Balman singh	234	Narendra	233	lalbihari Tiwari	227	Ram Bhadhra
227	Bharat singh	235	Bhagvat/Vinod	234	Ramlaxaman Tiwari	228	Arvind K S/o Govind
228	Sukal singh	236	Prem bai/ azuddi	235	Ramsurat Tiwari	229	Rajeev Nayan
229	Ram singh	237	Parvati/Ram	236	Indrajeet Tiwari	230	Bala Prasad
230	Dlip singh	238	Sona bai/Kashiram	237	Vijay dwivedi		**Khajurahra**
231	Panchm singh	239	Devendra/Hariram	238	Ramswayamber Tiwari	231	Ajay Singh
232	Jay singh	240	Sandhyarani/Ramesh	239	Brijkishre Tiwari	232	Jai Karan Singh
233	Raja ram yadav	241	Radharani/Munna	240	Ramjee Tiwari	233	Ram Milan Singh
234	Ramsakhi	242	Badi bai/Ratiram	241	Ramraj dwivedi	234	Mahendra Singh
235	Anil shahu	243	Dwarka Prasad/Sunder garg	242	Rambhola Tiwari	235	Raj Karan Singh
236	Deepak shahu	244	Baijnath Garg/Sunder	243	Virendra Dwivedi	236	Lallu Singh
237	Monu shahu	245	Guljar singh/Marnsingh	244	Surendra Tiwari	237	Mathura Singh
238	Raja shahu	246	Imransingh/Malkhan singh	245	Bhola Tiwari	238	Phoolmati W/o Ram Bahor Singh
239	Basori singh	247	Jahar singh/Lakh singh	246	Shailendra Tiwari	239	Baijnath Singh S
240	Nanhu singh	248	Manu Mishra/Rameswar	247	Arun Tiwari	240	Gullu Singh
241	Kuver singh	249	Pankaj mishra/Rameswar	248	Gopal Tiwari	241	Lalman Singh
242	Lok singh	250		249	Tulsi Tiwari	242	Narendra Singh
243	Baliram			250	Arun Pandey	243	Raj Bhan Singh

244	Taji Lal					244	Prem Lal Singh
245	Ram singh					245	Kesari Singh
246	Sampat singh Gothiya					246	Brijvasi
247	Ratiram Gothiya					247	Ram Lakhan
248	Jitu singh					248	Dinesh Singh
249	Sunni ram					249	Ram Vishvas Singh
250	Harvind singh					250	Rajroop Singh

Annexure IV

List of VLSS demonstrations in individual farmer's fields during 2010-11

State: Chhattisgarh

SNo	Farmer name/ Village	SNo	Farmer name/ Village	SNo	Farmer name/ Village	SNo	Farmer name/ Village
District: Raipur		**District: Durg**		**District: Rajnandgaon**		**District: Kabirdham**	
	Padabhat		**Bamhani and Deori**		**Ruatala and Teka**		**Nawagaon**
1	Shiv Verma	1	Roopsingh Sahu	1	Prasant Vaishnav	1	Sohan Nath
2	Ashwani Verma	2	Halalkhor	2	Gopal Thakur	2	Omkar Yogi
3	Ganesh Verma						

State: Madhya Pradesh

SNo	Farmer name/ Village	SNo	Farmer name/ Village	SNo	Farmer name/ Village	SNo	Farmer name/ Village
District: Jabalpur		**District: Rewa**		**District: Satna**			**District: Damoh**
SNo	**Shahpura**	**SNo**	**Maindhi**	**SNo**	**Gobraokhurd**	**SNo**	**Bathiya**
1	Ravesh K Upadhayay	1	M.L verma	1	Gajendra Singh	1	Makhan Patel
		2	Morradhwaj	2	Ranjeet Singh	2	Devendra Patel
		3	Raghuwansh			3	Mahendra Patel
		4	Ravendra Singh			4	Harigovindra Patel
		5	Keshav Singh			5	Bhanu Patel
						6	Banke Patel
						7	Shiv Charn Patel
						8	Salakram Patel
						9	Nannhe Patel
						10	Rajkumar Patel

9. Financial Report: Submitted

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