



Promotion of Improved Chickpea Varieties in Rice-Based Cropping Systems of Smallholder Farmers of Odisha

Chickpea in the Rice-Fallow Cropping System

MG Mula, S Samineni and PM Gaur

2015

Supported by RKVY sub-scheme



**International Crops Research Institute
for the Semi-Arid Tropics**



Government of Odisha

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The Semi-arid and Arid tropics ecology and weather have undergone a noticeable change due to climate change which has reduced pulse production by more than 56%. Considering this adverse effect of climate change, farming systems need to be established that are appropriate for, and tolerant towards, a specific area and its environment. Given these conditions, there is a need to increase production of pulses and improving livelihood by utilizing the rice-fallow cropping system of smallholder farmers. However, the focus should be on deep black soil where moisture retention is high that will last to 2-3 months as compared to red soils.

Rice-Fallow Cropping System – A new cropping system helps farmers grow two crops a year where before they could only grow one crop. The new system combines early ripening varieties of rice with chickpeas. Because the rice can be harvested early, there's time to sow a chickpea crop to take advantage of the moisture still left in the soil. Previously the rice ripened too late and the land was left fallow. Now, farmers can grow an extra crop, a big advantage where there is no irrigation.

Why Chickpea in the Rice-Fallow Cropping System?

- Cultivar: Desi and Kabuli
- Drought resistant crop
- Utilizes available residual moisture for 2-3 months
- Provides protein (23%), rich in fiber, minerals and β -carotene
- Enhanced soil by providing nutrient to the succeeding crop (fix nitrogen up to 140kg/ha)
- Adds organic matter to the soil
- Additional income to farmers (raw and seeds)
- Provides farmer feed/fodder to livestock
- Minimal tillage
- Dibbling method
- No basal fertilizer required but 2-3 times foliar (Urea) spray is required
- No weeding required
- Sowing (November/December)
- Harvesting (February/March)

Minimal Tillage

- Select rice fields with deep black soil or light soil having sufficient moisture just after harvesting rice.
- One Harrowing and levelling



- Hydropriming: 3-4 hours before sowing



- Dibble Method, Straight Line Sowing, and Spacing: 30cm x 20cm



- Seed Rate: 75 kg/ha (*Desi*) and 100 kg/ha (*Kabuli*)
- Plant Density: 166,000 plants @ one seed/hill



- Germination at 3 days after sowing

- Germination at 5 days after sowing



- Plant growth at 8 days after sowing

- Vegetative growth at 12 days after sowing



- Spray as foliar Urea base (2-3x) at increasing rate of 2% (20-30 days after sowing – depending upon crop stand) to 6%/ha (every 15 or 20 days after) during vegetative stages.

First foliar spray at 20 days and 40 days after sowing



3rd foliar spray at 60 days after sowing or at flowering stage



- Final Vegetative Stage



- Flowering Stage



- Pod Development Stage



- Maturity Stage; Productivity - 1,500 kg/ha





International Crops Research Institute for the Semi-Arid Tropics

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About ICRISAT: www.icrisat.org

ICRISAT-India (Headquarters)

Patancheru 502 324
Telangana, India
Tel +91 40 30713071
Fax +91 40 30713074
icrisat@cgiar.org

ICRISAT-Liaison Office

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

ICRISAT-Ethiopia

C/o ILRI Campus, PO Box 5689
Addis Ababa, Ethiopia
Tel: +251-11 617 2541
Fax: +251-11 646 1252/646 4645
icrisat-addis@cgiar.org

ICRISAT-Kenya (Regional hub ESA)

PO Box 39063, Nairobi, Kenya
Tel +254 20 7224550, Fax +254 20 7224001
icrisat-nairobi@cgiar.org

ICRISAT-Malawi

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

ICRISAT's scientific information: <http://EXPLOREit.icrisat.org>



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of the CGIAR Consortium

ICRISAT-Mali (Regional hub WCA)

BP 320, Bamako, Mali
Tel +223 20 709200
Fax +223 20 709201
icrisat-w-mali@cgiar.org

ICRISAT-Niger

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

ICRISAT-Nigeria

PMB 3491
Sabo Bakin Zuwo Road,
Tarauni, Kano, Nigeria
Tel: +234 7034889836; +234 8054320384,
+234 8033556795
icrisat-kano@cgiar.org

ICRISAT-Zimbabwe

Matopos Research Station
PO Box 776, Bulawayo, Zimbabwe
Tel +263 383 311 to 15
Fax +263 383 307
icrisatzw@cgiar.org