Introduction and Expansion of Improved Pigeonpea (*Arhar*) Production Technology in Rainfed Upland Ecosystems of Odisha

Technological Empowerment and Sustainable Livelihood

Project Completion Report (2011-2015)

and **2014-2015 Annual Accomplishment Report**

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for the Semi-Arid Tropics

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11 May 2015

Dr PK Meherda
Director
Department of Agriculture and Food Production
Bhubaneswar, Odisha
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Dear Dr Meherda,

Sub: Submission of **Project Completion Report and 2014-15 Physical and Financial Accomplishment Report** under the RKVY funded project **'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha'**

Greetings!

We are pleased to submit the **'Project Completion Report'** and the **'2014-15 Physical and Financial Accomplishment'** under the RKVY funded project **'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha'**. The project has achieved an increase in investment gain by as much as 700% (Rs 853 million as compared to the financing of Rs 102.89 million) over four years. The achievement benefitted 43,354 smallholder farmers (including 3,776 women) under the improved pigeonpea production technology (IPPT) and the seed production program. With these technologies, an increase in productivity of at least 37% was seen compared to the landraces and there was a minimum increase of 170-190% in net income. A total of 25,999 ha were cultivated during the project duration, which corresponded to an increase of 4% as against the physical target of 25,000 ha.

The Odisha University of Agriculture and Technology (OUAT) in partnership with ICRISAT, smallholder farmers, and the Department of Agriculture through Rashtriya Krishi Vikas Yojana (RKVY) have released a medium-duration, disease resistant pigeonpea hybrid (ICPH 3762) as 'Parbati' in the State Varietal Release Committee during October, 2014. The release proposal was further acknowledged through a certificate by assigning the National Identity Number IC 612565 by the Division of Germplasm Conservation of ICAR – National Bureau of Plant Genetic Resources on 4 March 2015. This is a first for pigeonpea in the state because no other varieties have been released earlier.

Further, smallholder farmers are happy with their produce as manifested in the documented 'Odisha Success Stories'. A farmer from Rayagada (**Mr Pradip Kumar Panda**) received awards and recognition; he was honored by the President of India (**Shri Pranab Mukherjee**) with the "**Krishi Karman Award for Progressive Farmers**" for pulses (pigeonpea) on 10 February 2014. This recognition was the first for Odisha, particularly for pigeonpea.

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The institutionalization of the seed system resulted in producing 1,941 tons of various seed classes (Foundation, Certified and Truthfully Labeled seeds) of farmer-preferred varieties (ICPL 14001, ICPL 14002, ICP 7035, and ICPL 88039) and hybrids (ICPH 2671, ICPH 2740, ICPH 3762) through the 'one village one variety' concept.

For long-term sustainability of quality seeds in the project, ICRISAT produced a total of 16.9 tons of nucleus/breeder seeds, which were made available in the seed system. The improved pigeonpea production technology (IPPT) resulted in producing a total 13,851 tons of commercial seeds (ICPL 14001, ICPL 14002, ICP 7035, ICPH 2671 and ICPH 2740) registering 37% increase in productivity as against the previously cultivated landrace.

There was a remarkable increase in participation of stakeholders (farmers, DA Officers and technicians, NGOs and ICRISAT staff) in capacity building and awareness in relation to pigeonpea cultivation. A total of 64,636 patrons (including 9,747 women) attended various meetings, seminar-workshops, trainings on crop seed production of hybrids and varieties, IPM/IDM, exposure visits, and *dal mill* and warehouse operation and management. The operationalization of *dal mills* for value addition in Rayagada, Kalahandi and Nuapada gave an impetus to the adoption of inclusive market-oriented development (IMOD) by providing a cheap source of processed pigeonpea dal in the village and adjacent villages, apart from additional livelihood to women self-help groups and NGOs. Likewise, the construction of 25 metric ton capacity warehouses at Rayagada and Nuapada; and a 100 metric ton warehouse at Kalahandi were very useful.

We wish to thank you for your continuous support to the project.

With warm regards,

Joanna Kane-Potaka
Director, Strategic Marketing & Communication

Copy: Mr Saroj Das, Director for Pulses, Government of Odisha

Drs Peter Carberry / Rajeev K Varshney / Myer G Mula / Ms Supriya Bansal, ICRISAT

Introduction and Expansion of Improved Pigeonpea (*Arhar*) Production Technology in Rainfed Upland Ecosystems of Odisha

'Technological Empowerment and Sustainable Livelihood'

Project Completion Report

(2011-2015)

and

2014-2015 Annual Accomplishment Report

(June 2014-May 2015)

Compiled and Written by

Myer G Mula, CV Sameer Kumar and Saroj Das

Submitted to

The Director

Department of Agriculture and Food Production
Bhubaneshwar, Odisha

(RKVY Sub-scheme)

This work has been undertaken as part of the CGIAR Research Program on Grain Legumes

ICRISAT Science with a human face

International Crops Research Institute for the Semi-Arid Tropics

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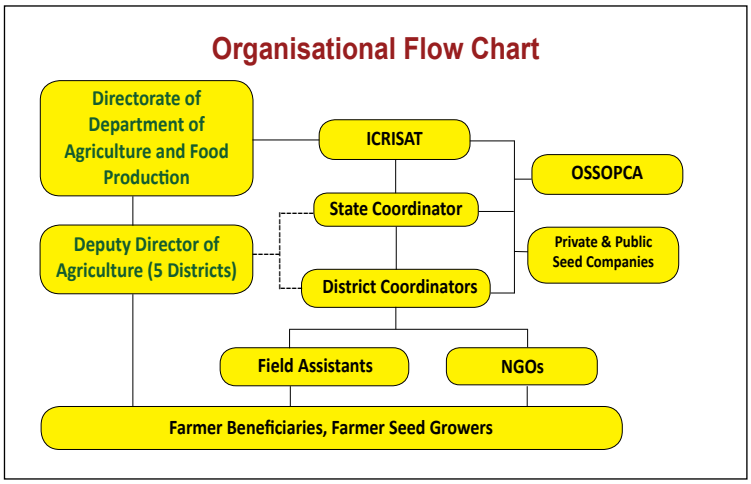
List of Partners

Agency	Name of Staff	Designation
Department of Agriculture	PK Meherda	Director
and Food Production, Odisha	SK Das	Assistant Director (Pulses)
	Mr A Mandal	DDA – Nuapada
	Mr KC Singh	DDA – Rayagada
	Mr A Sahu	DDA – Kalahandi
	Mr K Gouda	DDA – Boudh
	Mr M Mallik	DDA – Bolangir
ICRISAT	Dr D Bergvinson	Director General
	Dr Peter Carberry	DDG - Research
	Dr R Varshney	Director – Grain Legumes
	Dr CVS Kumar	Senior Scientist/Pigeonpea Breeding
	Dr MG Mula	Senior Scientist/Project Investigator
	Mr RV Kumar	Manager, Field Research Operations
	Mr S Tripathy	State Coordinator
	Ms J Das	Dist. Coordinator (Kalahandi)
	Mr Y Naik	Dist. Coordinator (Nuapada and Bolangir)
	Mr S Mohanty	Dist. Coordinator (Rayagada and Boudh)
Development in Education & Environment Protection NGO	Mr BK Meher	Director, Nuapada District
LOKSEBAK NGO	Mr AP Mohanty	Secretary, Kalahandi Dist.
People's Forum NGO	Mr SK Samal	Program Manager, Boudh Dist.
Shramika Shakti Sangha NGO	Mr TS Dharua	President, Bolangir Dist.
Centre for Social Action and Tribal Development NGO	Mr PK Pradhan	Secretary, Rayagada Dist.
OSSOPCA	Mr CS Rao	Director



The flow chart depicts the institutional organizational setup of the project's relationships and procedures in a way that shows how partnership can obtain the best results from the various efforts. The chart illustrates the structure of the project in terms of relationships among personnel or departments, and also highlights the lines of authority and responsibility within the project.

Figure 1. Project's Organizational Flow Chart.

Section 1:
Project Completion Report (2011-2015)

Completion report

Background Information

While 70% of the population lives in the rainfed upland ecosystem of Odisha, around 85% of the workforce depends on agriculture. There are about 8.7 million hectares of agricultural lands in the state of which 70% are rainfed. Production of pulses has been reduced to 56.4% of the total agricultural area, in the last ten years. The districts of Rayagada, Kalahandi, Boudh, Bolangir and Nuapada were identified by the project because of their dry and rainfed ecology. About 53,350 hectares of total tillable area is suitable for new high yielding pigeonpea varieties and hybrids in the five districts. The project intends to introduce and expand the production of high yielding pigeonpea varieties and hybrids by means of adaptation, selection and promotion through a farmer participatory approach.

Pigeonpea is mainly grown in rainfed upland areas and is one of the most important pulse crops of the state. It is an affordable source of protein (22-24%) and contains carbohydrates, minerals and vitamins. Pigeonpea, which is also a good source of essential amino acids, can be an excellent crop to promote food and nutritional security in Odisha. However, its productivity is low in Odisha at 415 kg/ha compared to the national average of 700 kg/ha. It also has a very low seed replacement ratio of 2-3%. A large section of farmers in the rainfed upland ecosystems of Odisha have remained isolated from improved cultivars and management practices of pigeonpea for various reasons. There is ample scope for the expansion of high yielding short and medium duration pigeonpea varieties and hybrids in the rainfed areas for the development of sustainable livelihoods. It is mainly for these reasons that this project was implemented.

The project '**Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in the Rainfed Upland Ecosystems of Odisha**' was funded by the Department of Agriculture and Food Production, Government of Odisha, India, through the Rashtriya Krishi Vikas Yojana (RKVY) sub-scheme 353 (No. 15(03)/19/2011). This was approved on 23 May 2011, for a period of 4 years from 2011 to 2015 with a total budget of Rs 10.288 crores (US$2.29 million). The project was officially launched on 09 August 2011 at ICRISAT, Patancheru, Telangana, India.

Highlights of Accomplishment

The developmental project operates around a holistic approach with emphasis on seed systems, technology improvement, capacity building, post-harvest innovation, and market oriented development; the varietal release in the state was a bonus. Table 1 presents the highlights of accomplishments. A total of 25,999 ha were cultivated during the entire duration of the project which corresponded to an increase of 4% as against the physical target of 25,000 ha (Table 2).

Table 1. Highlights of accomplishments vis-a- vis project objectives (2011-2015).

Project Objectives	Accomplished
To evaluate and identify newly developed high yielding disease resistant varieties and hybrids of pigeonpea for further introduction and expansion.	A total of 315 sites of farmer preferred varietal selection trials (FPVST) were established for the duration of the project. The project has introduced 14 cultivars of high yielding disease resistant varieties and hybrids. Among this, hybrid ICPH 3762 was released in Odisha as 'Parbati' in 2015 and three more varieties (ICP 7035, ICPL 14001 and ICPL 14002) will be properly documented for further release by the state. As per the records, no pigeonpea varieties or hybrids have been released so far in the state.

Continued...

Table 1. Highlights of accomplishments vis-a- vis project objectives (2011-2015). *(Continued)*

Project Objectives	Accomplished
To promote cultivation of high yielding pigeonpea varieties and hybrids in marginal soils.	The farmer preferred varieties (ICPL 14001, ICPL 14002 and ICP 7035) and hybrids (ICPH 2740 and ICPH 2671) were introduced for commercial purposes under improved pigeonpea production technology (IPPT) covering 21,714 ha and benefitting 38,011 smallholder farmers including 3,520 women farmers (Table 6) with an average yield of 587 kg/ha. As compared to farmers local variety of 368 kg/ha in five covered districts. The farmer-preferred varieties and hybrids were sown in different cropping systems - as an intercrop with cotton, maize, groundnut, upland rice, finger millet, and cucumber, along rice bunds or as sole crop. In some districts, it served as a soil conservation mechanism in mountain slopes, especially in the upland areas of Kalahandi and Rayagada.
To develop village-level seed systems to achieve self-sufficiency in seeds of farmer preferred improved varieties and hybrids of pigeonpea.	Seed saving is common among resource-poor farmers of Odisha since this is the only way for them to sustain their farming livelihood. The seed system model was formed in this project to put in place the 'one village one variety' concept because the formal seed sector cannot ensure the timely supply of the huge volumes of quality seeds required by the farmers. The benefit of partnering with the Seed Certifying Agency, OSSOPCA, is that it has strengthened and institutionalized the informal seed production system in the districts of Kalahandi, Nuapada, Bolangir and Rayagada. A total of 1,941 tons of farmer preferred varieties and hybrid seeds of various seed classes were produced, covering 4,080 hectares and benefitting 5,343 smallholder farmers including 256 women farmers (Table 6).
To build the capacity of farmers, NGOs and self-help groups, in sustainable pigeonpea production technology components.	A total of 64,636 stakeholders including 9,747 women (farmers, DA Officers and Technicians, NGOs, and ICRISAT staff members) attended various awareness meetings, seminar-workshops, training sessions on crop seed production of hybrid and varieties, IPM/IDM, dal mill operation and maintenance, godown management, international training, and season-long courses (Table 3). To reinforce capacity building, literature was developed and distributed to farmers or aired using various mass media tools (Table 4).
To enhance profitability by linking production with dal processing and marketing.	As part of value addition and empowering smallholder farmers through inclusive market-oriented development (IMOD), the project has provided 9 dal mills to NGOs and SHGs and constructed two 25 mt godowns in Rayagada and Nuapada, and one 100 mt godown in Kalahandi (Table 5).
To provide research backstopping for refinement and research on pigeonpea and IPPT components as identified by researchers and farmers in the target area.	One of the objectives of this project is to notify smallholder farmers about new technologies including high yielding cultivars through FPVST. The project provided 14 high yielding cultivars (9 varieties and 5 hybrids) to look into adaptability and performance in comparison with the existing local varieties through improved production practices. The straight line method of planting on ridges was followed with a seed rate of 8 kg/ha for local varieties and 4 kg/ha for hybrids including fertilizer at the rate of 100 kg/ha of DAP for all the trials. Aside from FPVST, research cum seed production of nucleus and breeder seeds of farmer preferred varieties were produced at ICRISAT. A total 16.9 mt were produced and utilized in the project. More than 50 crosses were made at the ICRISAT headquarters by utilizing local Odisha landraces and ICRISAT elite lines to breed vegetable type of pigeonpea.

Table 2. Details of the project area in the five districts covered in Odisha.

Districts	Total area (ha)	Total Village (no)	Block		Project Area (ha)									
			Total (no)	Cover (no)	2011		2012		2013		2014		Total	
					T	A	T	A	T	A	T	A	T	A
Rayagada	20800	2667	11	4	1500	1504	708	705	1000	1096	2500	1894	5708	5199
Kalahandi	13190	2236	13	6	1000	1116	2026	2089	2238	2242	3000	3519	8264	8966
Nuapada	5870	663	5	4	500	504	1522	1633	2000	2269	2500	3024	6522	7430
Boudh	4410	1186	3	2	-	-	503	500	750	697	1000	1053	2253	2250
Bolangir	9080	1794	14	2	-	-	503	503	750	608	1000	1043	2253	2154
Total	53350	7546	46	18	3000	3124	5262	5430	6738	6912	10000	10533	25000	25999

Note: T – target; A - accomplished

Table 3. Summary of four year capacity building.

Particular	Participant (no.)				
	2011	2012	2013	2014	Total
Project Orientation and Planning Workshop	513 (18F)	65 (1F)	88 (2F)	84 (22F)	750 (43F)
Project launching cum training workshop	16 (1F)	-			16 (1F)
Customized season-long training at ICRISAT (July 2013 - February 2014)	-	-	8	8 (2F)	16 (2F)
1st International Training Course on pigeonpea seed production and management	11	-	-	-	11
Pigeonpea Seed Production and Management Training	-	90 (10F)	506 (46F)	806 (120F)	1,402 (176F)
Hybrid seed production and management training for farmer seed growers	-	35	-	-	35
International training course on high throughput phenotyping of chickpea and pigeonpea	-	-	3	-	3
Training cum field exposure on pigeonpea seed production	-	13	38 (3F)	122 (117F)	173 (120F)
Farmers specialized training programs	195 (11F)	553 (4F)	696 (51F)	1,629 (311F)	3,073 (377F)
Intra-district exposure visit @ Rayagada	-	-	35 (3F)	-	35 (3F)
Scientific visit @ ICRISAT	-	19 (1F)	47 (8F)	8 (8F)	74 (17F)
Dal mill processing and maintenance training	-	38 (14F)	85 (42F)	39 (24F)	162 (80F)
Godown management training	-	-	70 (6F)	-	70 (6F)
Monthly hands-on farmers training	-	-	-	28 (2F)	28 (2F)
Farmers awareness meetings	-	3,663 (785F)	19,113 (2,881F)	33,983 (5,087F)	56,759 (8,753F)
Farmer's Field Day	1,248 (56F)	324 (53F)	457 (58F)	-	2,029 (167F)
Total	1,983 (86F)	4,800 (868F)	21,146 (3,100F)	36,707 (5,693F)	64,636 (9,747F)

Table 4. Summary of farmer friendly literature distributed.

	Year				
Topic	2011	2012	2013	2014	Total
Cultural Management Practices of Pigeonpea	2,000	3,750	5,000	5,000	15,750
Integrated Pest and Disease Management	3,000	2,800	7,000	7,000	19,800
Effective and efficient seed production system of pigeonpea varieties and hybrids	-	6,750	10,000	10,000	26,750
Total	5,000	13,300	22,000	22,000	62,300

Table 5. Summary of post-harvest facility.

	Year										
	2011		2012		2013		2014		Total		
Particulars	T	A	T	A	T	A	T	A	T	A	Remarks
Dal Mills	4	4	3	3	2	2	-	-	9	9	
Spiral seed cleaner	4	6	3	3	2	2	-	-	9	11	
Godown	3	2	-	1	-	-	-	-	3	3	Two 25 mt godowns were completed in 2014 at Nuapada and Rayagada while one 100 mt godown was partially completed in 2014. Poor workmanship was observed in the 100 mt godown in Bhawanipatnai, managed by the DDA Engineering Department of Kalahandi.

Note: T – target; A - accomplished

The over-all performance of the project has highlighted the increase in investment gain by as much as 700% (Rs 853 Million) as compared to the financing of Rs 102.89 Million for four years. Furthermore, smallholder farmers are happy with their produce as manifested in the documented 'Odisha Success Stories'. A farmer from Rayagada (**Mr Pradip Kumar Panda**) received awards and recognition; he was honored by the President of India (**Shri Pranab Mukherjee**) with the "**Krishi Karman Award for Progressive Farmers**" for pulses (pigeonpea) on 10 February 2014. This recognition was the first for Odisha or maybe for the entire country particularly for pigeonpea.

To put weight on the accomplishments, the Odisha University of Agriculture and Technology (OUAT) in partnership with ICRISAT, smallholder farmers, and the Department of Agriculture through Rashtriya Krishi Vikas Yojana (RKVY) have released a medium-duration, disease resistant pigeonpea hybrid (ICPH 3762) as 'Parbati' in State Varietal Release Committee during October, 2014. The release proposal was further acknowledge through a certificate by assigning the National Identity Number IC 612565 by the Division of Germplasm Conservation of ICAR – National Bureau of Plant Genetic Resources last March 04, 2015. This is the first of its kind for pigeonpea because no other varieties have been released in the state.

Project Benefit in Four Years (2011-2014 cropping season)

In the span of four years from 2011-2014, the net benefit was recorded at Rs 729 Million as against the total investment of Rs 102.89 Million, amounting to an increase of more than 700% (Table 6). The calculation was only based on the production of the improved pigeonpea production technology (IPPT) and on seed production (SP). The achievement benefitted 43,354 smallholder farmers including 3,776 women. Likewise, during the four year period, 25,794 hectares were covered by the project as against the target of 25,000 hectares with an increase of 794 hectares.

Table 6. Project Benefit in 4 years (2011-2014).

Year (a)	Budget allocation (RsM) (b)	Program (c)	Area (ha) Target (d)	Area (ha) Actual (e)	No. of farmers (f)	Total production (t) (g)	Estimated value (RsM) (h)	% Investment gain I=(b vs h)
2011	21.04	IPPT	2000	2102	5718	572	26	
		SP	1000	1000	1667	318	19	
2012	24.42	IPPT	4000	4069	6353 (385F)	2102	95	
		SP	1200	1300	1437 (67F)	590	35	
2013	27.15	IPPT	5620	5973	9983 (1358F)	4201	189	
		SP	1180	1240	1669 (137F)	691	42	
2014	30.28	IPPT	9500	9570	15957 (1777F)	6979	419	
		SP	500	540	570 (52F)	342	28	
Total	102.89		25,000	25,794	43354 (3776F)	15795	853	>729%

Note: IPPT – improve pigeonpea production technology; SP – seed production

Mid-Term Project Assessment Study (2011 and 2012 cropping season)

The results of the study depict the project's success in achieving its initial goals that were mainly, to evaluate and identify newly developed high yielding disease resistant pigeonpea varieties and hybrids in marginal soils; to develop village-level seed delivery systems to achieve self-sufficiency in seeds; capacity building of farmers, self-help groups, NGOs and Agri-technicians in sustainable production technology components; to enhance profitability by linking production with dal processing and marketing; and to provide research backstopping for refinement and improved pigeonpea production technology (IPPT) components.

The study covered a wide socio-demographic mixture of people from all age groups, with varying marital status and educational qualifications. Increased participation by women (34%) was noticed as part of the project activities. The women participants learned line sowing as well as improved seed storage practices and at the same time participated in various cultural management practices. Farmers were introduced to a number of technologies such as the introduction of new high yielding varieties (ICPL 14002, ICPL 14001 and ICP 7035) as against their landraces; reducing the seed rate for farmers' practice from 20-25 kg/ha to 12 kg/ha; application of fertilizer [di-ammonium phosphate (DAP) at 100 kg/ha]; application of insecticide, weeding,

and line sowing in ridges, which were not being practiced before the project started. With these technologies, a noticeable increase of at least 70% was seen in the productivity as against landraces and there was an increase of a minimum of 170-190% in net income.

Overall, the results obtained are very positive and suggestions were considered and have been implemented accordingly. The positive achievements of the project bring to light the need for continuous and additional support for the project not only because of the current investment gain but also due to the projected increase in production by year 2020 especially in Rayagada and Boudh (Table 7).

Table 7. Pigeonpea projected area and production for 2015 and 2020.

Area ('000 hectares)				
			Projection	
District	1990 - 2007 Area	CAGR*	2015	2020
Bolangir	9.19	-0.02	7.35	6.65
Boudh	4.80	0.05	6.51	8.17
Kalahandi	13.25	-0.03	11.01	9.39
Nuapada	5.87	-0.04	4.40	3.66
Rayagada	20.89	0.01	23.73	25.40
Production ('000 tons)				
	1990 – 2007		Projection	
District	Production	CAGR*	2015	2020
Bolangir	6.78	-0.01	6.43	6.03
Boudh	3.27	0.04	4.21	5.07
Kalahandi	13.18	-0.02	11.99	10.76
Nuapada	4.82	-0.01	3.82	3.60
Rayagada	19.34	0.01	19.58	20.70

*Compound Annual Growth Rate

Section 2:
2014-15 Annual Accomplishment

2014-15 Annual Accomplishment Report

Executive Summary

In the last year of its implementation the project has covered a larger area whereby production of pigeonpea has increased tremendously due to the interventions provided by ICRISAT through improved production practices and the adoption of high yielding varieties and hybrids. The total area sown with pigeonpea was recorded at 8,331 ha for improved pigeonpea production technology (IPPT); farmer preferred varietal selection trials (FPVST) were conducted at 105 sites or 42 ha (with 79 successful sites or 32 ha); and 371 ha productively produced various classes of seeds (foundation, certified and truthfully labeled seeds) of both farmers' preferred varieties and hybrids. A total of 10,533 ha were covered by the project as compared to the physical target of 10,000 ha, an increase of 533 ha (5%).

A remarkable increase in production was likewise observed with IPPT which generated 6,979 metric tons with a productivity of 765 kg/ha (better than the landrace at 451 kg/ha) and benefitted 15,957 smallholder farmers including 1,777 women (11%).The farmer-preferred varieties were sown in different cropping systems as an intercrop with cotton, maize, groundnut, upland rice, finger millet, and cucumber, along rice bunds or as a sole crop. In some districts, it served as a soil conservation mechanism, especially in the upland areas of Kalahandi and Rayagada. Likewise, smallholder-farmer seed growers have successfully enhanced various seed classes of farmer preferred varieties and hybrids by producing 306 metric tons. In this respect, the project has procured from farmer seed-growers, 15 metric tons of various seed classes for the extension project. This concept was introduced to strengthen the seed delivery system of the state by continuously supplying on time, quality seeds to smallholder-farmers. To backstop the seed system chain, ICRISAT has produced and supplied breeder seeds and hybrid parents, of farmer preferred varieties and hybrids. This has resulted in the production of 1,301 kgs of 14 high yielding cultivars. In addition, more than 25 crosses under the ICRISAT breeding program were produced to obtain vegetable type of pigeonpea. The said breeding lines will be further tested for their stability.

To constantly respond to the farmers' need for new high yielding cultivars, the FPVST showcased 5 hybrids and 8 varieties and results revealed that in medium duration trials, cultivars that produced more than 1 metric ton are ICPH 3933 (1513 kg/ha) followed by ICPL 20108 (1338 kg/ha), ICPH 2751 (1302 kg/ha), ICPL 14001 (1116 kg/ha) and ICPL 14002 (1103 kg/ha) which are far better than the local counterpart at 549 kg/ha. For early duration trials, all newly tested cultivars had higher yields than the local check. ICPL 88034 (1373 kg/ha), PRG 176 (1332 kg/ha), ICPL 161 (1221 kg/ha) and ICPL 88039 1174 kg/ha) had 79-110% higher yields than the local check.

There was a remarkable increase in the number of stakeholders (farmers, DA Officers and Technicians, NGOs, and ICRISAT staff) involved in capacity building and awareness in relation to pigeonpea cultivation. A total of 36,707 patrons (including 5,693 women) attended various meetings, seminar-workshops, training sessions on crop seed production of hybrid and varieties, IPM/IDM, exposure visits, and dal mill operation and management, which were held at different locations. Backing-up all these activities is the distribution of 22,000 copies of a wide range of farmer friendly literature in the local Oriya language. In addition, information on project implementation, activities and gains was disseminated through publication, in local and international print and electronic media for wider circulation among the stakeholders.

In order to market and add value to pigeonpea, a total of 30,000 kgs have been processed into dal and sold among farmers, during market days and trade fairs.

Physical Accomplishment

Improved Pigeonpea Production Technology (IPPT)

A majority of the farmers in Odisha cultivate pigeonpea landraces. Around 80-85% of the smallholder farmers plant pigeonpea as an intercrop (either with cotton, groundnut, maize, upland rice, pearl millet or finger millet), along rice bunds and along fish pens. Farmers normally do not apply any inputs (fertilizer and pesticides) and do not practice weeding in sole cropping. The intervention of the project in the IPPT was only through the provision of certified and TL seeds of new high yielding varieties and hybrids (ICPL 14002,ICPL 14001, ICP 7035, ICPH 2671, and ICPH 2740), line sowing (some farmers do line sowing in ridges) along with capacity building courses and distribution of literature on cultural management and practices, integrated pest management (IPM) and integrated disease management (IDM).

A total of 8,331 hectares were sown under IPPT which is 2,832.4 ha higher than the previous year's operation of 5,498.6 ha. The total production was 6,979.36 metric tons with a productivity of 765 kg/ha (better than the local check which was at 451kg/ha) and benefitted 15,957 smallholder farmers including 1,777 women (11%) (Table 8). However, productivity was lower than the previous year's cropping season due to non-favorable climatic conditions. Farmers prefer the new introduced varieties and hybrids to their local check due to their better taste and milling quality. Among the five districts, Kalahandi, Rayagada and Boudh performed better in terms of productivity at 929, 843 and 841 kg/ha, respectively as compared to the other two districts. However, the calculated increase in yield in the five districts was 70% more than their local check.

Rayagada: The average yield obtained by farmers from the varieties and hybrids was 843 kg/ha or 14.5% higher than local check which was 736 kg/ha (Table 8). A total of 1,086 ha were cultivated benefitting 3,007 smallholder farmers including 324 female farmers. Total production by the district was recorded at 915 metric tons.

Kalahandi: The average productivity of the varieties and hybrids was recorded at 929 kg/ha, a 165% higher yield than local check which was 350 kg/ha (Table 8). A total of 3,355 ha were sown with various cropping systems benefitting 6,203 smallholder farmers including 641 women farmers. Total production by the district was documented at 3,117 tons.

Nuapada: A total of 2,869 ha were planted with high yielding varieties and hybrids (which had a total production of 1823 tons) and served 4,453 smallholder farmers (374 women). The productivity level was recorded at 638 kg/ha, an increase of 110% over that of the local check which was 304 kg/ha (Table 8).

Boudh: As shown in Table 2, 1,065 smallholder farmers (166 women) benefitted from sowing 632 ha of pigeonpea varieties (ICPL 14002, ICP 7035 and ICPL 14001). Production and productivity was recorded at 531.8 tons and 841 kg/ha, respectively (Table 8). The productivity level was 35% higher than that of their local check (625 kg/ha).

Bolangir: The production and productivity of the district were recorded at 591 tons and 575 kg/ha, respectively covering 1,021 ha and benefitted 1,229 smallholder farmers including 272 female farmers (Table 8). The productivity was 140% higher than that of their local counterpart.

Table 8. Status of improved pigeonpea production technology (IPPT) in the five districts.

District	Block	Cultivar	Farmers (no.)	Area (ha)	Total production (t)	Average yield (kg/ha)	Local check average yield (kg/ha)
Rayagada	Rayagada	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	685 (92F)	269	231.03	859	750
	Kolnara	ICPL 14002 / ICPL 14001 / ICP 7035	531 (37F)	197	159.08	807.5	780
	K.singhpur	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH2740	908 (157F)	257	206.03	802	750
	Ramnaguda	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	613 (22F)	270	240.63	891	700
	Bisamcuttack	ICPL 14002 / ICPL 14001	270 (16F)	93	78.54	844.5	700
	Sub-Total		3007 (324F)	1086	915.31	843	736
Kalahandi	Bhawanipatna	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	1057 (132F)	610	557.30	913.6	380
	Kesinga	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	634 (46F)	620	568.67	917.2	370
	Narla	ICPL 14002 / ICPL 14001 / ICP 7035	1661 (120F)	680	636.21	935.6	380
	Lanjigarh	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	843 (137F)	510	471.63	924.8	390
	Dharmagarh	ICPL 14002 / ICPL 14001 / ICPH 2671 / ICPH 2740	791 (111F)	225	224.01	995.6	290
	Golamunda	ICPL 14002 / ICPL 14001 / ICP 7035	754 (40F)	430	397.91	925.4	340
	Th.rampur	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2740	463 (55F)	280	262	935.6	300
	Sub-Total		6203 (641F)	3355	3117.7	929.3	350

Continued...

Table 8. Status of improved pigeonpea production technology (IPPT) in the five districts. *(Continued)*

District	Block	Cultivar	Farmers (no.)	Area (ha)	Total production (t)	Average yield (kg/ha)	Local check average yield (kg/ha)
Nuapada	Komna	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671/ ICPH 2740	1342 (94F)	811	494.71	610	310
	Khariar	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	1193 (97F)	637	422.97	664	275
	Sinapali	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	1151 (85F)	776	481.90	621	350
	Boden	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671 / ICPH 2740	767 (98F)	645	423.77	657	280
	Sub-Total		4453 (374F)	2869	1823.35	638	304
Boudh	Kantamal	ICPL 14002 / ICPL 14001 / ICP 7035	629 (152F)	318	269.9	848.7	600
	Boudh	ICPL 14002 / ICPL 14001 / ICP 7035	436 (14F)	314	261.9	834.1	650
	Sub-Total		1065 (166F)	632	531.8	841.4	625
Bolangir	Bangomunda	ICPL 14002 / ICPL 14001 / ICP 7035 / ICPH 2671/ ICPH 2740	882 (177F)	648	382.32	590	210
	Muribahal	ICPL 14002 / ICPL 14001 / ICP 7035	347 (95F)	373	208.88	560	270
	Sub-Total		1229 (272F)	1021	591.20	575	240
Total			15957 (1777F)	8331	6979.36	765.34	451

Farmer Participatory Varietal Selection Trial (FPVST)

One of the objectives of this project is to notify smallholder farmers about new technologies including high yielding cultivars through FPVST. The project provided five early maturing varieties, three medium duration varieties and five medium hybrids to look into adaptability and performance in comparison with the existing local cultivars. Aside from the seeds (at the rate of 8 kg/ha for variety and 4 kg/ha for hybrids), fertilizer at the rate of 100 kg/ha of DAP and insecticide were supplied. The straight line method of planting on ridges was followed for all the trials. Of the 80 sites established for medium duration trials and 25 for early duration trials, only 64 and 15 sites respectively, were successfully implemented due to damage during sowing and the early vegetative stage due to continuous rainfall and poor farmers' management.

In the medium duration trials, cultivars that produced more than 1 metric ton are ICPH 3933 (1,513 kg/ha) followed by ICPL 20108 (1,338 kg/ha), ICPH 2751 (1,302 kg/ha), ICPL 14001 (1,116 kg/ha) and ICPL 14002 (1,103 kg/ha). This further revealed that the new varieties and hybrids are giving better yields, 100-175% higher than the local counterpart at 549 kg/ha (Table 9). For early duration trials, all newly tested cultivars gave higher yields than the local check. ICPL 88034 (1373 kg/ha), PRG 176 (1332 kg/ha), ICPL 161 (1221 kg/ha) and ICPL 88039 (1174 kg/ha) had 79-110% higher productivity despite maturing 130 days earlier than the local check (Table10).

Table 9. FPVST status of medium duration cultivars in the five districts.

		Average yield (kg/ha)								
District	Site (no.)	ICPL 14001	ICPL 14002	ICPL 20108	ICPH 3762	ICPH 2751	ICPH 3933	ICPH 2671	ICPH 2740	Local (check)
Rayagada	9	923	828	-	773	-	-	926	859	596
Boudh	5	869	820	-	676	-	-	907	766	542
Bolangir	10	-	1072	-	1155	-	-	884	919	329
Kalahandi	20	1557	1592	1522	-	1536	1369	-	-	762
Nuapada	20	-	1204	1155	1174	1068	1657	1068	1096	516
Total	64	1116	1103	1338	944	1302	1513	946	910	549

Table 10. FPVST status of early duration cultivars in the five districts.

		Average yield (kg/ha)					
District	Site (no.)	ICPL 88039	ICPL 88034	ICPL 161	ICPL 81-3	PRG 176	Local (check)
Rayagada	1	1055	904	904	844	1024	753
Boudh	1	1748	2048	1506	1446	1656	695
Bolangir	5	746	895	1027	738	1143	422
Kalahandi	4	1547	1595	1635	896	1557	766
Nuapada	4	774	1425	1035	953	1278	637
Total	15	1174	1373	1221	975	1332	655

Hybrid Release in Odisha

The Odisha University of Agriculture and Technology (OUAT) in partnership with ICRISAT, smallholder farmers, and the Department of Agriculture have released a medium-duration, disease resistant pigeonpea hybrid (ICPH 3762) as 'Parbati' in State Varietal Release Committee during October, 2014. This was realized through the conduct of FPVST. The release proposal was further acknowledged by assigning the National Identity Number IC 612565 by the Division of Germplasm Conservation of ICAR – National Bureau of Plant Genetic Resources in March 04, 2015. This is the first of its kind for pigeonpea because no other varieties have been released in the state.

During CY 2013, the on-farm testing of ICPH 3762 in five districts of Odisha (Kalahandi, Naupada, Rayagada, Boudh and Bolangir) under the project 'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha' recorded an increase of 124% over local check based on data from 72 locations. The local farmers were surprised by this performance and moreover this hybrid is resistant to two major diseases Fusarium wilt and sterility mosaic diseases. This hybrid was likewise tested in multilocation trials in different locations in India.

Seed Systems

There is a need to continuously enhance and strengthen the Odisha formal and informal seed sector to sustain the requirement of smallholder farmers for quality seeds and new high yielding cultivars. The seed system model was formed in this project to put into place the 'one village one variety' concept (Figure 2) because the formal seed sector cannot ensure timely supply of the huge volumes of quality seeds required by the farmers. The benefit of partnering with the Seed Certifying Agency, OSSOPCA, is that it has strengthened and institutionalized the informal seed production system in the five districts.

The project started by identifying villages and providing them with one farmer preferred variety and hybrid parent material suited to the type of soil. The participation of OSSOPCA was critical

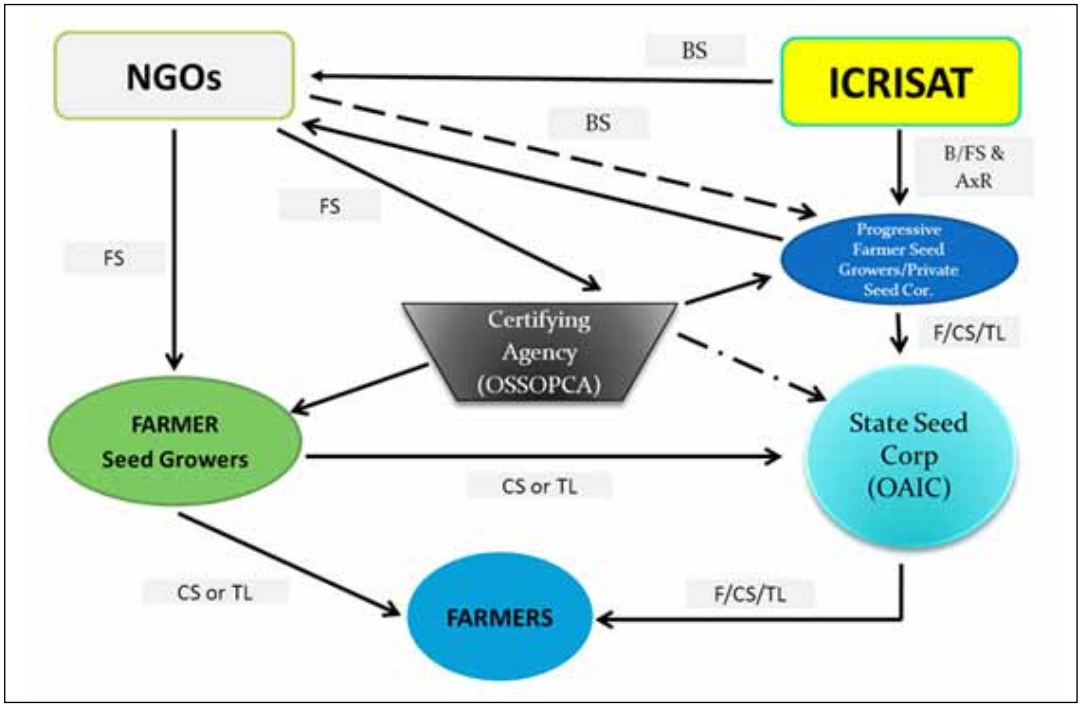


Figure 2. Seed system institutionalized in the Odisha pigeonpea project.

in monitoring and maintaining good quality seeds of farmer-preferred varieties and hybrids. An isolation distance of 300 m between varieties and 500 m for hybrid seed production was initiated. However, the national policy of considering only released varieties of less than 10 years to be certified, has led to the non-certification of various seed classes of farmer preferred varieties produced in the project. This condition has forced the project's smallholder seed growers to sell their produce to middlemen/traders. Nevertheless, during the 2015 harvest season, farmers have experienced a better price of Rs 10-20 more per kg than what they got in the previous year. Prices of pigeonpea have gone up by as much as 30% due to reduced production which is related to the abrupt change in rainfall pattern that damaged the crop during sowing as well as during the vegetative and flowering phases.

A continuous delivery of pure seeds to farmers will enhance seed production and the quality of the seeds. ICRISAT will continuously supply Breeder seeds of farmer-preferred varieties and parental lines of hybrids to selected progressive farmer seed growers to multiply into Foundation and hybrid seeds. The Foundation seeds produced by farmer seed growers will then be distributed to selected farmer seed growers for seed multiplication of Certified and TL seeds. The entire seed production process will be carried out under the watchful eye of OSSOPCA for monitoring and certification.

Certified Seed Production

A total of 158.72 metric tons of certified seeds were produced in 201 ha benefitting 319 smallholder farmers (including 33 female farmers) (Table 11). The average yield for the three districts was listed at 752 kg/ha. Rayagada had the highest productivity of 876 kg/ha followed by Kalahandi at 768 kg/ha as compared to the other two districts.

Rayagada: The total production of Certified seeds was 29.81 metric tons from 34.8 ha and benefitted 57 smallholder farmers including 5 women farmers (Table 11). The average yield was recorded at 876.5 kg/ha.

Kalahandi: Seed production of Certified seeds totaled 61.06 tons from 72 ha and benefitted 93 farmers including 9 women farmers (Table 11). The average productivity was 768 kg/ha. The low average calculated yield of the district was due to poor performance of early duration cultivars that were affected during the flowering stage when strong rains hampered the pollination of flowers. On the contrary, medium duration cultivars had an increase in yields, recording more than 1 metric ton per hectare like in the case of ICPL 14001, ICPL 14002 and ICP 7035.

Bolangir: Production of ICP 7035 was recorded at 9.86 metric tons from 15 ha and benefitted 11 smallholder seed growers (Table 11).

Nuapada: A total production of 57.99 tons was harvested from 79.2 ha with an average productivity of 701 kg/ha and benefitted 158 farmers including 19 women farmers (Table 11).

Table 11. Certified seed production by district and block.

District	Block	Variety	Farmer (No)	Area Certified (ha)	Total Yield (t)	Average Yield (kg/ha)
Nuapada	Komna	ICPL 14001	12	6	4.17	695
		ICPL 14002	9 (1F)	5.2	3.69	709
		ICP 7035	20	10	7.4	740
	Khariar	ICPL 14002	7 (1F)	5	3.92	784
		ICPL 14001	11 (4F)	5	4.28	856
		ICP 7035	9	5	3.76	752
	Sinapali	ICPL 14001	12	5	3.66	732
		ICP 7035	47	20	15.15	757
	Boden	ICPL 14001	12 (1F)	10	7.36	736
		ICP 7035	14 (9F)	5	4.34	868
		ICPL 88039	5 (3F)	3	0.26	87
	Sub-Total		158 (19F)	79.2	57.99	701.5
Bolangir	Muribahal	ICP 7035	4	5	3.39	678
	Bangomunda	ICP 7035	7	10	6.47	647
	Sub-Total		11	15	9.86	662.5
Kalahandi	Bhawanipatna	ICPL 14002	4	3	3.18	1060
		ICPL 14001	4	3	1.90	633
		ICP 7035	12	5	4.95	990
		ICPL 88039	2	1	0.21	210
	Kesinga	ICPL 14001	5	5	5.13	1026
		ICPL 14002	2 (1F)	3	2.47	823
		ICP 7035	13	5	4.92	984
		ICPL 88039	2	1	0.21	210
	Narla	ICPL 14001	4	3	2.90	967
		ICPL 14002	2	2	1.58	790
		ICP 7035	9	8	8.65	1081
		ICPL 161	1	6	0.13	130
	Dharmagarh	ICPL 14001	3 (2F)	4	3.94	985
		ICP 7035	1	2	1.63	815
	Lanjigarh	ICPL 14001	8	10	9.69	969
		ICP 7035	13 (5F)	8	7.31	914
	Golamunda	ICPL 7035	2 (1F)	2	2.03	1015
		ICPL 88039	4	1	0.23	230
	Sub-Total		93 (9F)	72	61.06	768.4
Rayagada	Rayagada	ICPL 14001	14 (4F)	6.8	5.96	876
		ICPL 14002	1	1	0.91	910
		ICP 7035	2	1	0.81	810
	Ramnaguda	ICPL 14001	7	2	2.42	1210
		ICP 7035	1	1	0.96	960
	Kolnara	ICPL 14001	7 (1F)	7	6.07	867
		ICPL 14002	4	2	1.81	905
		ICP 7035	2	2	1.34	670
	K.singhpur	ICPL 14001	18	11	8.77	797
		ICP 7035	1	1	0.76	760
	Sub-Total		57 (5F)	34.8	29.81	876.5
Total			319 (33F)	201	158.72	752.23

Foundation Seed Production

A total of 143.7 ha were cultivated for Foundation seed production of farmer-preferred varieties which covered three districts. Total production was recorded at 121.5 metric tons with a productivity of 692 kg/ha benefitting 216 farmer seed growers including 19 women farmers (Table 12). Among the districts, Rayagada had the highest productivity of 811 kg/ha.

Nuapada: A total of 38.71 metric tons were produced in 50.2 ha with a productivity of 641 kg/ha benefitting 78 smallholder farmers including 9 women farmers as seen in Table 12.

Rayagada: A total of 28.5 ha were cultivated to produce 30.84 metric tons of foundation seeds of ICPL 14001, ICPL 88039, PRG 176 and ICP 7035 and benefitted 31 smallholder farmers including 1 woman farmer (Table12). This district had the highest yield of 811 kg/ha as compared to the other two districts.

Kalahandi: The total production of foundation seeds was recorded at 51.95 metric tons from 65 ha and benefitted 107 smallholder farmers including 9 women farmers (Table 12). Productivity was recorded at 623 kg/ha.

Table 12. Foundation seed production by district and block.

District	Block	Variety	Farmer (No)	Area Certified (ha)	Total Yield (mt)	Average Yield (kg/ha)
Nuapada	Khariar	ICPL 14002	4	2	1.57	785
		ICPL 14001	8 (1F)	5	5.18	1036
		ICP 7035	14 (2F)	10	8.87	887
		ICPL 87091	6	2	1.18	590
	Komna	ICPL 14002	6	3	2.35	783
		ICP 7035	6	5	4.03	806
		PRG 176	2	1.2	0.31	258
	Sinapali	ICPL 7035	14	5	3.74	748
		PRG 176	6 (3F)	2	0.92	460
		ICPL 161	1	1	0.31	310
	Boden	ICP 7035	3	5	4.92	984
		ICPL 14001	6 (3F)	5	4.44	888
		ICPL 87091	1	2	0.33	165
		ICPL 88039	1	2	0.56	280
	Sub-total		78 (9F)	50.2	38.71	641
Rayagada	Rayagada	ICP 7035	10 (1F)	5	5.08	1016
		ICPL 14001	3	2	1.39	695
		PRG 176	2	1	0.39	390
	Kolnara	ICPL 14001	8	13	17.10	1315
	K.singhpur	ICPL 14001	6	6	6.00	1000
		ICP 7035	1	0.5	0.38	760
	Ramnaguda	ICPL 88039	1	1	0.50	500
	Sub-total		31 (1F)	28.5	30.84	811

Continued...

Table 12. Foundation seed production by district and block. *(Continued)*

District	Block	Variety	Farmer (No)	Area Certified (ha)	Total Yield (mt)	Average Yield (kg/ha)
Kalahandi	Narla	ICPL 14001	4	5	4.87	974
		ICPL 14002	1	2	2.03	1015
		ICP 7035	3	4	3.60	865
	Kesinga	ICPL 14001	7	3	3.03	1010
		ICPL 14002	9 (2F)	5	5	1000
		ICP 7035	17 (1F)	5	5.61	1122
		ICPL 88039	1	1	0.15	150
		ICPL 87091	3 (1F)	2	0.37	185
		PRG 176	5	2	0.38	190
		ICPL 161	1	1	0.13	130
	Bhawanipatna	ICPL 14002	10 (1F)	4	4.18	1045
		ICPL 88039	5	4	0.71	177.5
		ICP 7035	10 (1F)	5	5.34	1068
		ICPL 87091	2	1	0.25	250
		PRG 176	1	2	.14	70
	Th.Rampur	PRG 176	3 (1F)	2	0.42	210
	Dharmagarh	ICPL 14001	4	4	4.29	1072.5
		PRG 176	1	1	0.12	120
	Golamunda	ICPL 88039	1	1	0.15	150
		ICP 7035	1	1	0.92	920
	Lanjigarh	ICPL 14001	16 (2F)	8	8.38	1047.5
		ICP 7035	2	2	1.88	940
	Sub-total		107 (9F)	65	51.95	623
Total			216 (19F)	143.7	121.5	692

Hybrid seed production (AxR)

Hybrid technology is new to Odisha. Although we have gained two years experience by the project, farmer seed growers, NGOs and technicians should continuously be trained to produce quality seeds. Three promising hybrids (ICPH 2671, ICPH 2740 and ICPH 3762) were introduced benefitting 35 smallholder farmers for seed multiplication of hybrid seeds. A total of 38.8 hectares were sown with a production of 25.63 metric tons of A-line and 8.78 metric tons of R-line seeds (Table 13). The seeds (A-Line) will be utilized as commercial hybrids in the IPPT fields in the coming 2014-15 cropping season.

Table 13. Hybrid seed production (AxB) by district and block.

					A-Line		R-Line	
District	Block	Hybrid	Area (ha)	Farmer (No)	Total production (mt)	Average yield (kg/ha)	Total production (mt)	Average yield (kg/ha)
Kalahandi	Kesinga	ICPH 2740	5	1	4.5	900	1.5	300
		ICPH 3762	0.4	1	0.45	1125	0.15	375
	Narla	ICPH 2671	4	1	1.5	375	0.5	125
		ICPH 2740	7	4	1.37	196	0.70	100
	Bhawanipatna	ICPH 2740	0.8	2	0.43	400	0.23	320
	Sub-Total		17.4	9	8.25	599	2.58	244
Nuapada	Boden	ICPH 2740	3	3	2.89	963	1.01	337
		ICPH 2671	4	1	2.64	660	0.88	220
	Komna	ICPH 2740	2	2	1.32	660	0.38	190
		ICPH 3762	1	1	0.65	650	0.42	420
	Khariar	ICPH 2740	4	7	5.42	1353	1.35	337
	Sub-Total		14	14	12.92	857	4.04	301
Bolangir	Bangomunda	ICPH 2740	1.2	2	0.76	633	0.14	118
	Sub-Total		1.2	2	0.76	633	0.14	118
Rayagada	Rayagada	ICPH 2671	1.8	3	1.80	600	0.30	300
		ICPH 3762	0.4	1	0.30	300	0.70	350
	Kolnara	ICPH 2740	1	1	0.40	400	0.25	250
		ICPH 3762	0.5	1	0.20	400	0.25	500
	K.singhpur	ICPH 2740	1.5	2	0.60	400	0.22	150
	Ramnaguda	ICPH 2740	1	2	0.40	400	0.30	300
	Sub-Total		6.2	10	3.7	417	2.02	308
Total			38.8	35	25.63	626.5	8.78	243

Research Backstopping at ICRISAT

The pupose of the pigeonpea research program under this project was to improve the Odisha germplasm for breeding purposes. Three local landraces of long duration type (240-250 days) were collected in 2012, purified and used for breeding purposes to produce vegetable type pigeonpea. The said landraces were maintained with multiple sub-types of single plant selection (SPS) (Manjahai Kandula-18 SPS; Kaveri Local- 15 SPS and Rayagada Local-22 SPS). Besides purifying the landraces, an adiallel crossing program and crossing with elite lines were implemented (Table 14). The objective of this program is to come up with large seeded pigeonpea that has a sweetness coupled with resistance to diseases (sterility mosaic and *Fusarium* wilt) and pests (pod borer) and can be used for canning and freezing.

Table 14. ICRISAT breeding and research program.

Diallel Crossing Program	Number of F1 seeds harvested	SN	Improving local types by crossing with elite lines	Number of F1 seeds harvested
PH 1-16-2-2 x Kaveri Local P# 1151	50	1	Rayagada Local x ICPL 161	10
ICPL 87091 x Kaveri Local P# 1151	122	2	PH 1-16-2-2 x Manjahai Kandula	4
ICPL 87119 x Kaveri Local P# 1151	121	3	PH 3-7-5 xManjahai Kandula	13
ICP 8863 x Rayagada Local 1-11-17	75	4	PH 6-5-5 x Manjahai Kandula	4
ICPL 85063 x ManjahaiKandula 3-4	104	5	PH 7-1-5 x Manjahai Kandula	7
ICPL 85063 x Rayagada Local 1-11-17	73	6	PH 10-1-4 x Manjahai Kandula	5
Kaveri Local-2-27 x ICP 7035	200	7	ICP 7035 x Manjahai Kandula	20
Kaveri Local-2-27 x ICPL 85063	240	8	ICPL 14002 x Manjahai Kandula	11
Kaveri Local-2-27 x ICPL 87091	102	9	PH 1-16-2-2 x Kaveri Local	3
Kaveri Local-2-27 x ICPL 87119	211	10	PH 2 x Kaveri Local	50
Kaveri Local-2-27 x ICPL 88039	90	11	PH 6-5-5 x Kaveri Local	12
Kaveri Local-2-27 x PH 7-8	56	12	PH 7-1-5 x Kaveri Local	30
Kaveri Local-2-27 x Rayagada Local 1-11-17	22	13	PH 10-1-4 x Kaveri Local	1
Manjahai Kandula-3-4 x ICP 13395	78	14	ICP 7035 x Kaveri Local	20
Manjahai Kandula-3-4 x ICP 7035	256	15	ICPL 87091 x Kaveri Local	23
Manjahai Kandula-3-4 x ICP 8863	115	16	ICPL 14002 x Kaveri Local	29
Manjahai Kandula-3-4 x ICPL 87091	177	17	PH 1-16-2-2 x Rayagada Local	8
Manjahai Kandula-3-4 x ICPL 87119	145	18	PH 2 x Rayagada Local	2
Manjahai Kandula-3-4 x ICPL 88039	175	19	PH 3-7-5 x Rayagada Local	1
Manjahai Kandula-3-4 x PH 1-6	220	20	PH 6-5-5 x Rayagada Local	10
Manjahai Kandula-3-4 x PH 7-8	90	21	PH 7-1-5 x Rayagada Local	10
Manjahai Kandula-3-4 x Rayagada Local 1-11-17	210	22	PH 10-1-4 x Rayagada Local	12
Rayagada Local 1-11-17 x ICP 13395	333	23	ICP 7035 x Rayagada Local	19
Rayagada Local 1-11-17 x ICP 7035	283	24	ICPL 87091 x Rayagada Local	5
Rayagada Local 1-11-17 x ICPL 87091	370	25	ICPL 14002 x Rayagada Local	27
Rayagada Local 1-11-17 x ICPL 87119	306	26		
Rayagada Local 1-11-17 x ICPL 88039	245	27		
Rayagada Local 1-11-17 x PH 1-6	318	28		
Rayagada Local 1-11-17 x PH 7-8	237	29		

Seed Reconstitution and Multiplication at ICRISAT

To strengthen the seed system component of the project, ICRISAT continuously produces a total of 1,301 kgs of Breeder seeds of farmer preferred varieties and parental lines of hybrids to maintain their quality and productivity (Table 15).

Table 15. Summary of Breeder seeds produced at ICRISAT.

Cultivar	Growth habit	Maturity duration	Type of seeds	Quantity (kg)
Variety				
ICPL 14002	Non-determinate	Medium	Breeder seeds	356
ICPL 14001	Non-determinate	Medium	Breeder seeds	305
ICP 7035	Non-determinate	Medium to long	Breeder seeds	144
ICPL 20326	Non-determinate	Super early	Breeder seeds	42
ICPL 20338	Determinate	Super early	Breeder seeds	160
MN 1	Determinate	Early	Breeder seeds	10
MN 5	Determinate	Early	Breeder seeds	17
MN 8	Determinate	Early	Breeder seeds	10
ICPL 151	Determinate	Early	Breeder seeds	1
ICPL 87	Determinate	Early	Breeder seeds	25
ICPL 151	Determinate	Early	Breeder seeds	20
ICPL 88039	Non-determinate	Early	Breeder seeds	68
ICPL 161	Non-determinate	Early	Breeder seeds	150
PRG 176	Non-determinate	Early	Breeder seeds	13
Total				1,301

Seed Procurement for 2015-2016 Cropping Season

Establishing the seed system in the project site has made the purchase of good quality seeds efficient and effective, apart from the benefit in income that the farmer seed growers get. Each sample of the processed seeds was drawn by OSSOPCA to be submitted to the Bargarh Seed Testing Laboratory (STL) for germination test, moisture percentage, purity percentage and percentage of insect damage. The total seeds of various seed classes of varieties and hybrids procured by the project for the 2015-2016 cropping season was 33 metric tons. These seeds will be used in Maharastra and in the Pigeonpea Extension Project of Odisha (Table 16).

Table 16. 2015 Seed procurement.

Particulars	Cultivars	Quantity (kg)	Remarks
Foundation Seeds	ICP 7035	2,549	Procured at project sites
	ICPL 14001	3,433	
	ICPL 14002	3,840	
	ICPL 88039	258	
	ICPL161	425	
	PRG 176	327	
	ICPL 87091	145	
Sub-total		10,977	
Certified Seeds	ICPL 14001	2,000	Procured at project sites
	ICPL 14002	1,000	
	ICP 7035	1,000	
	ICPL 161	23	
Sub-total		4,023	
Hybrids	ICPH 2671	1,000	Procured at project sites
	ICPH 2740	16,800	
	ICPH 3762	200	
Sub-total		18,000	
Grand total		33,000	

Capacity Building

The year 2014-15 saw an increasing participation of smallholder farmers in various capacity building activities as well as the involvement of women farmers (15%). A total of 36,707 stakeholders including 5,693 women (farmers, DA Officers and Technicians, NGOs, and ICRISAT staff members) attended various awareness meetings, seminar-workshops, trainings on crop seed production of hybrids and varieties, IPM/IDM, dal mill operation and maintenance, season-long and exposure visits (Table 17).

Table 17. Capacity building conducted and attended by various stakeholders.

Particular	District (no.)	Participant (no.)	Women (no.)	Remarks
Project Orientation and Planning Workshop	5	84	22	NGOs, ICRISAT Staff, Farmers and DA Officers and Technicians
Customized season-long training at ICRISAT	3	8	2	DCs, SC, NGO, Field attendants
Pigeonpea Seed Production and Management Training	5	806	120	Farmer seed growers; Technicians of Kalahandi, Rayagada, Nuapada; NGOs; ICRISAT staff
Training cum field exposure on pigeonpea seed production	1	122	117	Field Attendants, Farmers, DoA Officers and ICRISAT Staff
Farmer specialized training programs	5	1,629	311	Pigeonpea awareness, IPM / IDM, cultural management
Scientific visit @ ICRISAT	3	8	8	Women Farmers and ICRISAT staff
Dal mill processing and maintenance training	2	39	24	SHGs of Rayagada, Nuapada, Kalahandi
Monthly hands on training of farmers	1	28	2	Rayagada
Farmers' awareness meetings	5	33,983	5,087	Farmer beneficiaries
Total		36,707	5,693	

Literature, Print and Electronic Media, and Publication

Literature (Booklets and Pamphlets)

To complement stakeholders', awareness meetings, training sessions, and seminar-workshops, the project distributed various farmer friendly publications in the Oriya language. A total of 22,000 smallholder farmers benefitted from the booklets on cultural management practices of pigeonpea, integrated pest and disease management, and pamphlets on effective and efficient seed production system of pigeonpea varieties and hybrids (Table 18). This literature was distributed to farmers during seed distribution for the conduction of IPPT and seed production, as well as during the conduct of trainings and field exposure visits and during agro-trade fairs.

Table 18. Farmer friendly literature in Oriya language.

Particular	Topic	Copy (no.)	Farmers (no.)
Booklet	Cultural Management Practices of Pigeonpea	5,000	5,000
Booklet	Integrated Pest and Disease Management	7,000	7,000
Pamphlet	Effective and efficient seed production system of pigeonpea varieties and hybrids	10,000	10,000
Total		22,000	22,000

Print and Electronic Media

An effective way to advocate project implementation among farmers in Odisha is through local and international news articles and through the use of local electronic media for wider circulation of project activities and benefits (Table 19). There are at least 5 local print media concerns that are interested in writing about Odisha pigeonpea project activities. Moreover, nine articles were published in 'ICRISAT Happenings' during the 2014-15 cropping season.

Table 19. Enhancing local-level awareness through print and electronic media.

Particulars	Location	Date	Topic
Radio	Kalahandi	18 Jul, 2014	Production technology and benefits of HYVs and hybrids of Arhar
Radio	Kalahandi	22 Mar, 2014	Production technology of pigeonpea intercropping with cotton
TV (Door Darshan)	Kalahandi	15 Sep, 2014	Commercial cultivation of pigeonpea and value addition
Local Daily (Dharitri) Kalahandi		15 Oct, 2014	Six women farmer representatives attending the World Women Agriculture Day
Local Daily (Bhaskar)	Kalahandi	16 Oct, 2014	Women Farmer Awarded
Local Daily (Bhaskar and Samaj)	Kalahandi	13 Nov, 2014	Role of smallholder farmers in agriculture
Local Daily (Dharitri)	Kalahandi	13 Nov, 2014	Role of smallholder farmers in agriculture
Local Daily (Samaj)	Nuapada	24 Sept, 2014	Successful and awardee women farmer from Sinapli block is felicitated
Local Daily (Prameya)	Nuapada	28 Sep, 2014	Training on cultural practices of pigeonpea
Local Daily (Sambad)	Rayagada	29 Sep, 2014	Block level training program of ICRISAT
Local Daily (Dharitri)	Nuapada	15 Oct, 2014	Participation of six women farmers at World Women Farmers Day at ICRISAT, Patancheru
Local Daily (Samaj)	Nuapada	9 Feb, 2015	Successful event of four years of Odisha pigeonpea project in Nuapada District
Local Daily (Samaj)	Nuapada	29 Mar, 2015	ICRISAT pigeonpea farmer felicitated at Khariar Mohatsav
ICRISAT Happenings	Telangana	3 Apr, 2015	ICRISAT participates in Odisha state agriculture fair
ICRISAT Happenings	Telangana	27 Mar, 2015	Indian state of Odisha gets its first hybrid pigeonpea
ICRISAT Happenings	Telangana	9 Jan, 2015	Odisha government extends ICRISAT pigeonpea project for four years
ICRISAT Happenings	Telangana	28 Nov, 2014	ICRISAT scientists honored
ICRISAT Happenings	Telangana	12 Sep, 2014	ICRISAT awards outstanding women farmers in India
ICRISAT Happenings	Telangana	22 Aug, 2014	Pigeonpea improves women participation and enhances livelihoods
ICRISAT Happenings	Telangana	14 Mar 2014	Pigeonpea cultivation improving livelihoods of farmers in Odisha, India
ICRISAT Happenings	Telangana	28 Feb 2014	Season-long training on pigeonpea seed production and management concludes
ICRISAT Happenings	Telangana	14 Feb 2014	Farmer partner on pigeonpea seed production in Odisha, India receives top honor

Publication

The year 2013 provided an avenue to publish important documents pertaining to the milestones the project has achieved (Table 20). Aside from the 2013 annual report, 140 success stories of smallholder farmers' testaments (on how they have improved their livelihood) were documented from Nuapada (26), Kalahandi (32), Boudh (18), Bolangir (15) and Rayagada (49). In addition, the Mid-term Assessment of the project was also published.

Table 20. 2014 Publications.

Particulars	Copy (no)	Title
2013 Annual Report	100	Mula MG and Saxena KB. 2014. Introduction and expansion of improved pigeonpea (Arhar) production technology in rainfed upland ecosystems of Odisha. Accomplishment report (June 2013-May 2014) and 2014 Physical Targets. ICRISAT, Patancheru 502324, Telangana, India.
Odisha Pigeonpea Success Stories (English)	100	Mula MG, Gopalan RS, Saxena KB, Das SK, Kumar RV, Kumar CVS. Mohanty SK, Naik YB, Das Juli and Tripathy SK. 2014. ICRISAT Pigeonpea: A seed for positive change. Patancheru, Telangana, India: ICRISAT. 160 pp.
Odisha Pigeonpea Success Stories (Oriya)	100	Mula MG, Gopalan RS, Saxena KB, Das SK, Kumar RV, Kumar CVS. Mohanty SK, Naik YB, Das Juli and Tripathy SK. 2014. ICRISAT Pigeonpea: A seed for positive change. Patancheru, Telangana, India: ICRISAT. 193 pp.
Mid-Term Impact Assessment Study	50	Rosana Mula, Myer Mula, R SanthaGopalan, Saroj Das, RV Kumar, KB Saxena. 2014. Mid-Term Impact Assessment Study: Final Report. Introduction and expansion of improved pigeonpea (Arhar) production technology in rainfed upland ecosystems of Odisha. 79 pp.

Post-Harvest and Processing Facility

ICRISAT's strategy of adopting the inclusive market-oriented development (IMOD) approach by providing additional livelihood to farmers, NGOs and self-help groups (SHG), has benefitted from the dal mill machines and spiral seed cleaner provided by the project. A total of 30,000 kgs have been processed into dal and sold among farmers, during market days and trade fairs. The operationalization of dal mills in Rayagada, Kalahandi and Nuapada brought in an inexpensive way of processing pigeonpea dal right to the doorstep of smallholder farmers in the village and in adjacent villages. In addition, construction of 25 metric ton (Rayagada) and 100 metric ton (Kalahandi) godowns has made it possible for farmers to store their seeds appropriately.

Awards and Recognitions

A resounding accomplishment of the project was the honor bestowed on one of our farmer cooperators (Mr Pradip Kumar Panda) by the President of India (Shri Pranab Mukherjee) - the "Krishi Karman Award for Progressive Farmers" on pulses (pigeonpea) on 10 February 2014. The said recognition was the first for Odisha on pulses and particularly pigeonpea. Likewise, the ICRISAT scientist Dr Myer G Mula was recognized for his contributions to pigeonpea seed system improvement in the state on 9 November, 2014. In addition, ICRISAT through the Director General William D Dar, bestowed the 'Partnership Award' to the Department of Agriculture and Food Production headed by Director RS Gopalan during the December 10, 2014 Annual Day at the ICRISAT headquarters.

Challenges for the Improvement of the Project

The 2013-2014 cropping season was a better year for pigeonpea stakeholders. Although some areas were affected by continuous rain, most smallholder farmers realized an increase in yield as compared to their usual local cultivars. The hiring of District Coordinator, Field Attendants and the engagement of NGOs has helped a lot in monitoring project activities. Table 21 presents the constraints and possible solutions for improving project implementation.

Table 21. Constraints in project implementation.

Constraints	Solution
Limited ability of farmer seed growers to sell their various certified seeds at higher prices.	DoA to take the lead in purchasing or linking the produce of farmer seed growers to market.
Natural calamity	Abnormal and harsh rainfall pattern that affects pigeonpea during the vegetative and flowering phase.
Abrupt drop of temperature (8-10°C) in December, which adversely affected the fertilization of PP flowers and caused the flowers to drop.	Introduction of early duration varieties (ICPL 88039, PRG 176, ICPL 161, ICPL 87091, ICPL 81-3, ICPL 88034).
Pests during flowering and pod development stage.	Provision of pesticide in seed production and IPPT. DoA to provide a subsidy scheme for fertilizer and pesticide to fully support the program. In seed production, the project will provide 50% of the fertilizer and pesticides.
Non-compliance of the technology by other farmers.	Farmer selection must be given strict importance.
Non-certification of ICP 7035 by leading institution	Government of Odisha with assistance from Odisha Agricultural University and Technology (OUAT) to release ICP 7035 as a state variety.
Seed procurement	Department of Agriculture should take the lead in ensuring the purchase of good quality seeds.

Financial Report

The budget for operating the project in 2014-2015 was granted with ₹302.81 lakhs and was fully utilized as shown in the attached utilization certificate and statement of accounts (Annex 1).

ICRISAT
Science with a human face

International Crops Research Institute for the Semi-Arid Tropics

Dr. Pramod Kumar Meherda
Director of Agriculture and Food Production
Government of Odisha
Bhubaneswar – 751 001

25 March 2015

Dear Dr. Meherda,

Sub: Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology (IPPT) in Rainfed Upland Ecosystems of Odisha.

Please find attached the Utilisation Certificates (OGFR-19) for 1 April, 2014 to 28 February 2015 for the above project.

Kindly arrange to remit Rs. 18,67,000 towards balance funds for the financial year 2014 - 2015, as per the bank details below:

Name of the Account	:	ICRISAT
Account Number	:	908102000000037
Type of Account	:	Current
Name of the bank	:	IDBI Bank, ICRISAT, Patancheru Hyderabad – 502 324, Telangana
IFSC Code	:	IBKL0000908
Branch Code	:	908
MICR Code	:	500259006

With regards,

Yours sincerely

Rajesh Agrawal
Assistant Director General
Finance

Encl: As above

Copy: Drs. Sameer Kumar / Myer G Mula / Ms. Joanna Kane-Potaka (ICRISAT)

Yor01

Headquarters:
Patancheru 502 324
Telangana, India
Tel +91 40 30713071
Fax (O) +91 40 3071 3074
+91 40 3071 3075
E-mail icrisat@cgiar.org

UTILISATION CERTIFICATE

(OGFR-19)

RASTRIYA KRUSHI VIKASH YOJANA (RKVY)

Sl.No.	Letter No. And Date	Amount Sanctioned
1	RTGS 26/05/2014	1,84,14,000
2	RTGS 05/11/2014	1,00,00,000
	Total	**2,84,14,000**

1. Certified that out of Rs. 2,84,14,000 (Rupees One Crore Eighty Four Lakhs Fourteen only) of grant in aid sanctioned during the year 2014-15 in favour of Director General, ICRISAT, Patancheru, AP by the Director of Agriculture & Food Production, Government of Odisha, Bhubaneswar under RKVY vide letter No. NIL, and an amount of Rs. 27,70,708 is receivable as at 31 March 2014 and a sum of Rs. 2,71,27,459 (Rupees Two Crores Seventy One Lakhs Twenty Seven Thousand Four Hundred Fifty Nine only) has been utilized during 1 April 2014 to 28 February 2015 and the balance receivable amount as of 28 February 2015 is Rs.14,84,167 (Rupees Fourteen Lakhs Eighty Four Thousand One Hundred Sixty Seven only).

2. We have met the project targets on time.

3. Certified that I have satisfied that the condition on which the grant in aid was sanctioned have been duly fulfilled and that I have exercised the following checks to see that the money was actually spent for the purpose for which it was sanctioned.

Kinds of checks exercised:

1. The Financial management of the project has been done thru Financial Services, ICRISAT.
2. Procurements have been made thru centralized Purchase and Supplies Division, ICRISAT.
3. Expenditures have been verified and approved by the Project Manager.
4. ICRISAT maintains its accounting records as per CGIAR-Guidelines.

Signature- 

Rajesh Agrawal

Designation: Assistant Director General Finance

Date: 24 March 2015

(Seal)

ICRISAT
Statement of Account
For the period April 1, 2014 to February 28, 2015 and cumulative to February 28, 2015

Project Title : Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology (IPPT) in Rainfed Upland Ecosystems of Odisha
Donor : Agriculture Department, Government of Odisha
Classification : Restricted - Bilateral Project
Currency : USD
Duration : May 1, 2011 to April 30, 2015

Item	Budget		Expenditure: Cumulative to March 31, 2014		Expenditure: April 1 to February 28, 2015		Expenditure: Cumulative to February 28, 2015		Balance as at February 28, 2015	
	INR	US$	INR	US$	INR	US$	INR	US$	INR	US$
A. Recurring										
1. Personnel	24,169,000	434,939	17,650,906	327,760	6,394,162	105,194	24,045,118	432,954	122,882	1,985
2. Production Program										
a. Seed Cost (IPPT)	21,035,000	386,664	14,850,000	264,950	6,219,153	102,266	21,069,153	367,216	(34,153)	(552)
b. Foundation Seed Production	3,245,000	58,604	2,145,000	40,110	1,073,990	18,274	3,218,990	58,384	26,010	420
c. Certified Seed Production	8,960,000	162,691	6,963,459	119,655	2,400,320	49,560	9,363,779	169,214	(403,779)	(6,523)
d. Hybrid Seed Production	920,000	15,828	420,000	7,351	500,000	8,477	920,000	15,828	-	-
e. Seed Certification	1,206,250	20,606	706,250	12,540	812,961	13,322	1,519,211	25,662	(312,961)	(5,056)
f. FPVT operations	3,040,000	55,773	2,658,167	49,439	672,373	11,009	3,330,540	60,467	(290,500)	(4,694)
g. NGO support	7,036,750	122,156	4,296,750	76,078	2,565,353	43,257	6,862,103	119,335	174,647	2,821
h. @ KVK (seed production)	3,300,000	67,951	2,450,000	53,541	850,000	14,410	3,300,000	67,951	-	-
i. @ ICRISAT (seed production)	3,820,000	73,773	3,820,000	74,215	-	(442)	3,820,000	73,773	-	-
j. Capacity Building (Trainings, Seminars, Workshops) and Publications	4,040,000	96,610	3,973,396	55,905	169,657	2,770	4,143,053	58,275	(103,053)	(1,665)
Unallocated - additional funds for 2014/2015	1,249,000	20,197			1,279,667	20,692	1,279,667	20,692	(30,667)	(495)
4.Travel	2,542,000	49,853	2,412,426	47,681	174,379	2,896	2,586,805	50,577	(44,805)	(724)
5. Contingencies	1,400,000	25,082	1,058,217	19,382	337,896	5,637	1,396,113	25,019	3,887	63
Sub-Total	**85,962,000**	**1,550,927**	63,464,641	1,168,026	**23,449,911**	**397,321**	**86,854,552**	**1,565,347**	**(892,552)**	**(14,420)**
B. Non-recurring										
1. Equipment & accessories	4,748,000	87,256	3,522,549	67,459	-	-	3,522,549	67,459	1,225,451	19,797
Sub-Total	**4,748,000**	**87,256**	3,522,549	67,459	-	-	**3,522,549**	**67,459**	**1,225,451**	**19,797**
C. Institutional Overheads	13,420,000	249,577	9,692,519	186,394	3,677,548	62,376	13,370,066	248,770	49,934	807
Grand Total	**104,130,000**	**1,887,760**	76,679,708	1,421,879	**27,127,459**	**459,697**	**103,747,167**	**1,881,576**	**382,833**	**6,184**

Funds Status	INR	US$
Balance receivable as at April 1, 2014	**2,770,708**	**41,602**
Less: Amount received during the period	28,414,000	477,206
Total funds available	**25,643,292**	**435,604**
Less: Expenditure during the period	27,127,459	459,697
Balance receivable as at February 28, 2015	**1,484,167**	**24,093**

Notes:

1. Total budget and line item classifications are as specified by the donor at project inception.
2. Currency conversions (INR/US$) are at average exchange rates as applicable.

Rajesh Agrawal
Assistant Director General
Finance

YORW (CVSK)

Section 3:
Photo Documentation

Improved Pigeonpea Production Technology (IPPT)

a. Seed Distribution






b. Seed Sowing

c. IPPT in Various Cropping System

Cotton intercrop with pigeonpea.

Maize intercrop with pigeonpea.

Finger millet intercrop with pigeonpea.

Upland rice intercrop with pigeonpea.

Pigeonpea along fishponds.

Groundnut intercrop with pigeonpea.

Pigeonpea in rice bunds.

Pigeonpea along water reservoirs.

Pigeonpea in mountain slopes.

Cowpea with pigeonpea.

Pigeonpea in mango orchard.

Pigeonpea as sole crop.

Farmer Participatory Varietal Selection Trial (FPVST)


I.C.P.L 87-3


I.C.P.L 86034

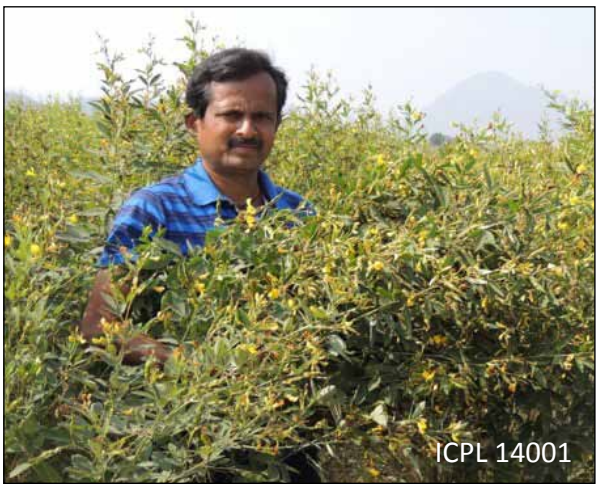

MARUTI


ASHA


KAMIKA


ICPH 2671

Foundation, Certified and Hybrid Seed Production



Harvesting and Threshing of Foundation, Certified and Hybrid Seeds

Seed Procurement and Processing

Seed Production and Processing of Breeder and Hybrid Seeds @ ICRISAT

Variety and Hybrid Seed Production and Seed Reconstitution @ ICRISAT

Capacity Building

a. Specialized Training for DoA Staff, NGOs and ICRISAT Personnel

b. Project Orientation Workshop


ICRISAT
ORIENTATION TRAINING CUM WORKSHOP
FOR
"INTRODUCTION AND EXPANSION OF IMPROVED PIGEONPEA PRODUCTION TECHNOLOGY IN UPLAND ECOSYSTEMS OF ODISHA"
DATE - 25.04.2012
VENUE - HOTEL CENTRE PARK, BHAWANIPATNA
RESOURCE PERSONS - Dr. MYER, G. MULA AND R. RAMA RAO, ICRISAT
FINANCIAL SUPPORT - RASTRIYA KRUSHI VIKASH YOJNA, GOVERNMENT OF ODISHA


ICRISAT
ହରତ ବିହନ ଉତ୍ପାଦନକାରୀ କୃଷକମାନଙ୍କର ତାଲିମ କାର୍ଯ୍ୟକ୍ରମ
(PIGEONPEA SEED GROWER'S TRAINING PROGRAMME)
ତାରିଖ:୦୬.୦୬.୨୦୧୨ ସ୍ଥାନ: ହୋଟେଲ ଭାଗିରଥୀ ଇନ୍, ଭବାନୀପାଟଣା
Date: 6th June 2012 Venue: Hotel Bhagirathi Inn, Bhawanipatna
ଓଡିଶାରେ ବର୍ଷ ଆଧାରିତ ଉଚ୍ଚ ଜମିରେ ଉନ୍ନତ ହରତ ଉତ୍ପାଦନ କୌଶଳର ପ୍ରବର୍ତ୍ତନ ଓ ପ୍ରସାରଣ
(Introduction & Expansion of Improved Pigeonpea Production Technology in upland Ecosystems of ODISHA)
ତାଲିମଦାତା: ଡକ୍ଟର ମାୟାର ଜି ମୁଲା, ଇକ୍ରିସାଟ୍, ହାଇଦରାବାଦ
(RESOURCE PERSON: Dr. MYER G. MULA, ICRISAT)

c. Farmers Specialized Training on Godown and Dal Mill Processing and Management

d. IPM and IDM Farmers Training

e. Farmer Seed Growers Training

f. Farmers Awareness Meetings

g. Farmer's Field Day

h. Attendance to the State and District Agricultural Trade Fair


ICRISAT
International Crops Research Institute


ICRISAT


ICRISAT


ICRISAT

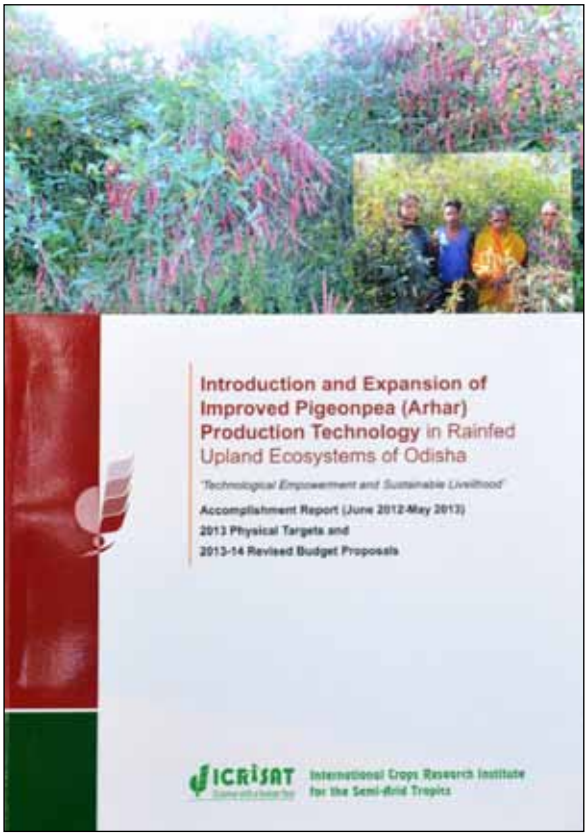

Semi-Grid Tropics

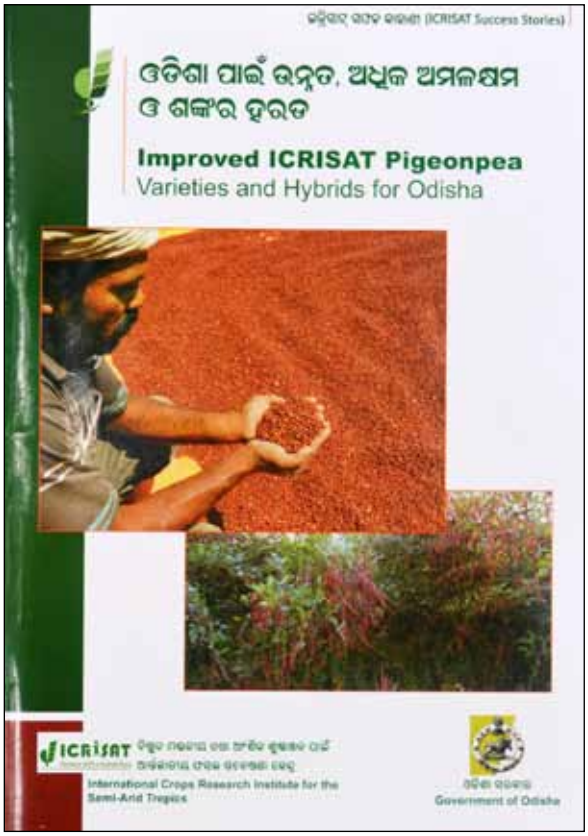

ICRISAT
International Crops Research
Institute for Semi-Grid Tropics

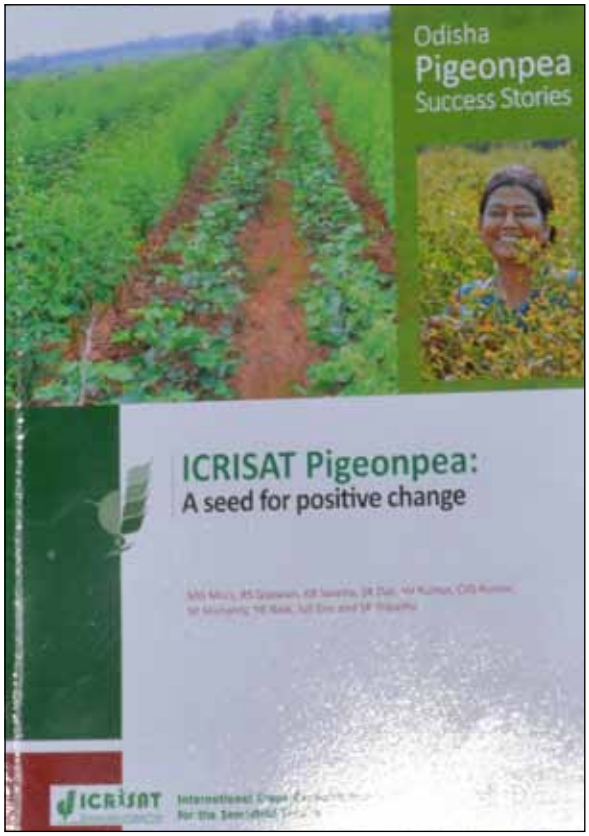
Farmer Friendly Literatures

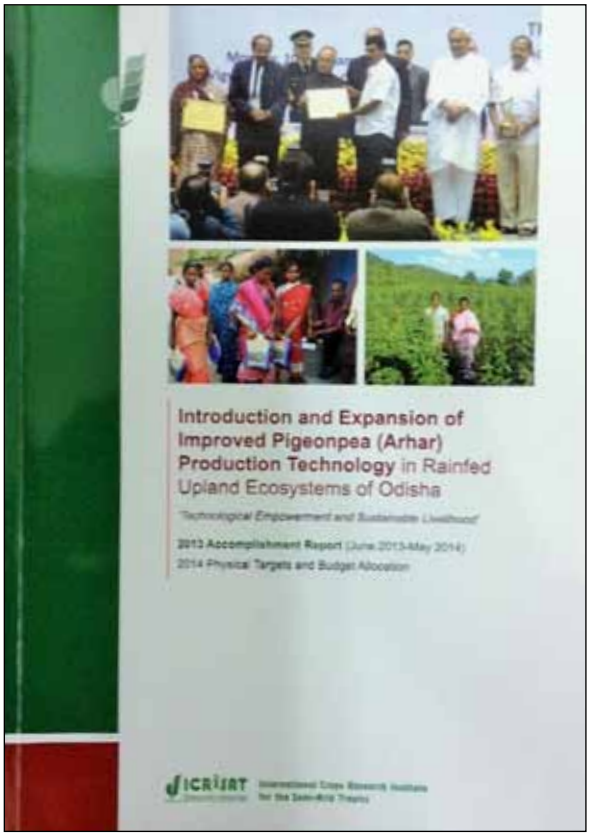
a. Booklets and Pamphlets

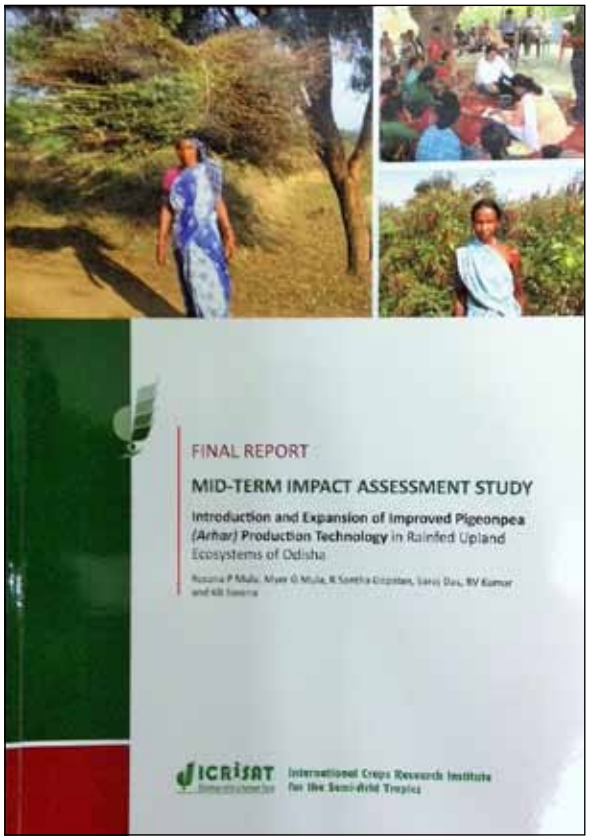
b. Publications

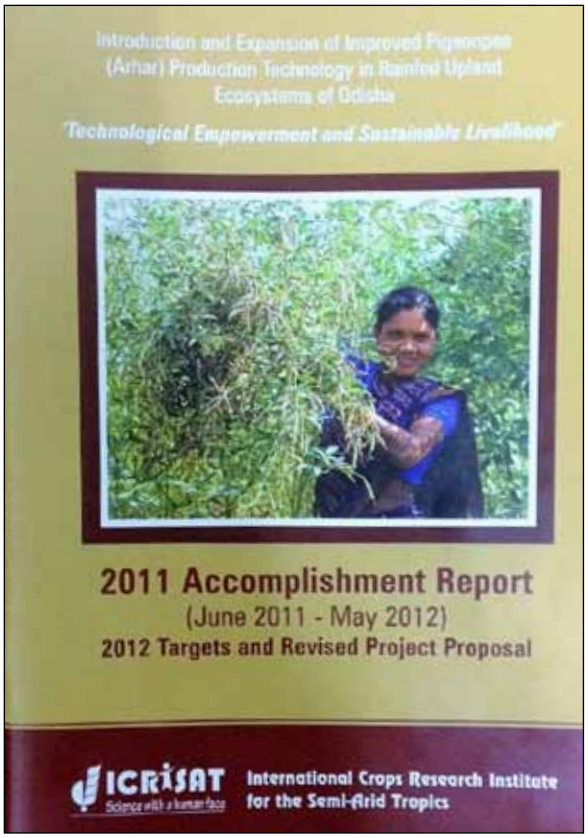





Odisha
Pigeonpea
Success Stories
ICRISAT Pigeonpea:
A seed for positive change
ICRISAT


Introduction and Expansion of
Improved Pigeonpea (Arhar)
Production Technology in Rainfed
Upland Ecosystems of Odisha
2013 Accomplishment Report
2014 Physical Targets and Budget Allocation
ICRISAT


FINAL REPORT
MID-TERM IMPACT ASSESSMENT STUDY
Introduction and Expansion of Improved Pigeonpea
(Arhar) Production Technology in Rainfed Upland
Ecosystems of Odisha
ICRISAT
International Crops Research Institute
for the Semi-Arid Tropics


Introduction and Expansion of Improved Pigeonpea
(Arhar) Production Technology in Rainfed Upland
Ecosystems of Odisha
'Technological Empowerment and Sustainable Livelihood'
2011 Accomplishment Report
(June 2011 - May 2012)
2012 Targets and Revised Project Proposal
ICRISAT
Science with a human face
International Crops Research Institute
for the Semi-Arid Tropics

Prints and Electornic Media

Posters

News Articles

a. Local News Articles

కంది సాగులో ఉత్పాదకత పెంచుతాం

'మొరాకో'

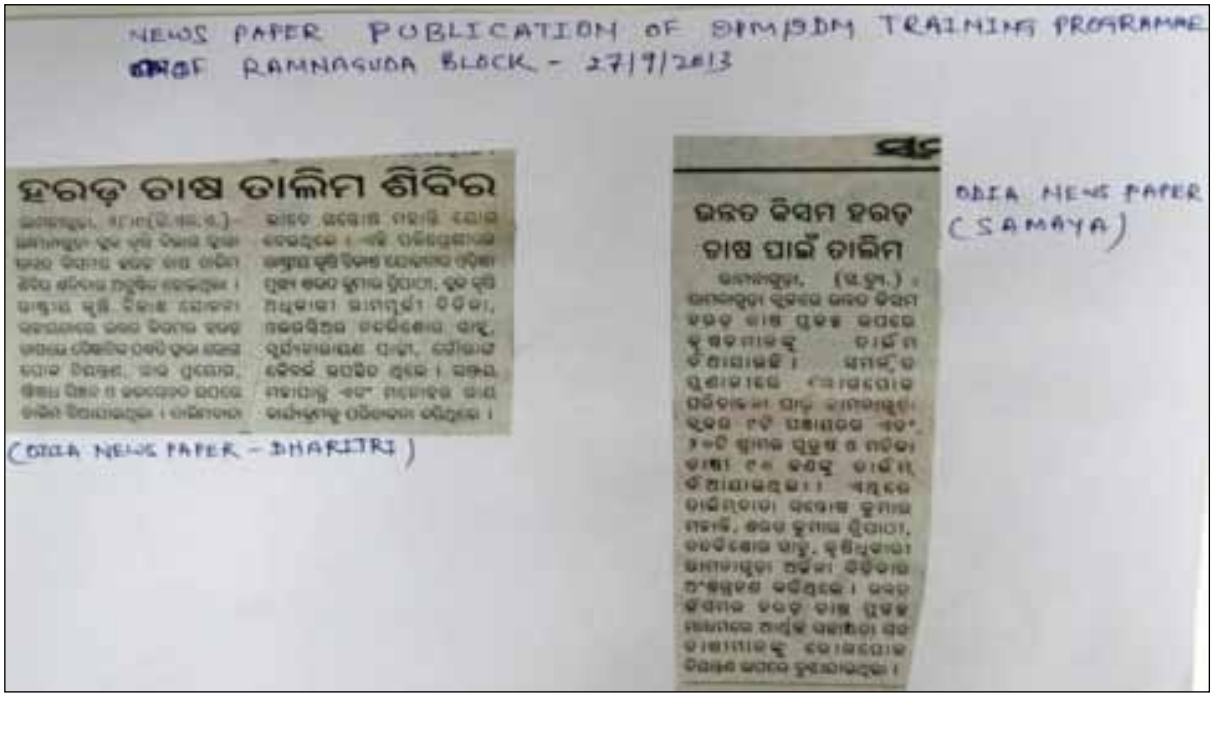
కంది సాగు భేష్

ଓଡ଼ିଶା

ଭାସ୍କର

ODISHA BHASKAR

ପଶ୍ଚିମ ଓଡ଼ିଶାରେ ହରଡ ଚାଷର ପ୍ରଚାରପ୍ରସାର ପାଇଁ ନୂଆ ପଦକ୍ଷେପ



NEWS PAPER PUBLICATION OF DMP/DDM TRAINING PROGRAMME AT RAMNAGUDA BLOCK - 27/9/2013

ହରଡ଼ ଚାଷ ତାଲିମ ଶିବିର

(ODIA NEWS PAPER - BHARITRI)

ଉନ୍ନତ ବିସମ ହରଡ଼ ଚାଷ ପାଇଁ ତାଲିମ

(ODIA NEWS PAPER (SAMAYA)

ହରଡ଼ ଫସଲରେ ରୋଗପୋକ ପରିଚାଳନା ତାଲିମ ଶିବିର

(SAMAYA)

ରୋଗପୋକ ପରିଚାଳନା ତାଲିମ

(SAMAYA)

(SAMBAD)

କୃଷକ କ୍ଷେତ୍ର ଦିବସ ପାଳିତ

THE SAMAYA — ODISHA'S PREMIER COLOUR DAILY

BHUBANESWAR — SUNDAY, 17 FEBRUARY 2013

ସମୟ

ପ୍ରତିଷ୍ଠାତା : ବସନ୍ତ କୁମାର ବିଶ୍ୱାଳ

Bhubaneswar • Balasore • Angul • Berhampur • Sambalpur

E-mail : thesamaya@yahoo.com, www.orissamaya.com

ହରଡ଼ ବିହନ ଉତ୍ପାଦନରେ ଲାଭ

(translated from Odia to English)

Profit from Pigeonpea Seed Production

Bhubaneswar, (Samaya Bureau):

This year our Pigeonpea seed growers have got a very good return from their land, where in the previous years, they were not got such returns from other crops.

This year, through the Dept. of Agriculture, Govt. of Odisha under RKVY Scheme, ICRISAT has implemented introduction and expansion of improved Pigeonpea production technology in rain fed upland ecosystems of Odisha. This can be easily viewed from the Kesinga Block of Kalahandi District.

The Farmers of Boria village of this block has joined with the seed production programme and has produced foundation seeds of Asha and Maruti varietes of Pigeonpea. A leader farmer named as Sri. Indubhusan Swain, has told that the pigeonpea plants have grown with profused branching, which are filled with pods. thats why the seed growers of his village are going to get a good yield by giving their seeds to ICRISAT as per Govt. rate. As a result of which it will help to meet the demand of Pigeonpea seed in our state.

District Collectorate, Bhawanipatna, Kalahandi

Reporter, LOKSEBAK

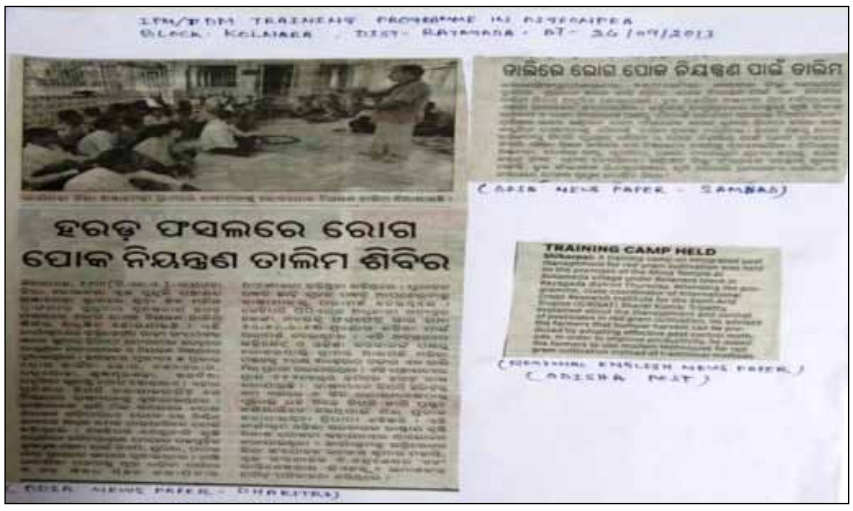
ଧରିତ୍ରୀ — ମଙ୍ଗଳବାର ୧୧ ଫେବ୍ରୁୟାରୀ ୨୦୧୪

ଜାତୀୟ-ଅନ୍ତର୍ଜାତୀୟ ୧୨

&

tion of *Krishi Karman* Awards 2012-13

Mr Pradeep Kumar Panda, a farmer from Kolnara Block of Rayagada District, Odisha, got best farmer award [Pulses (Pigeonpea)] from President of India. He had 35 acres of Maruti foundation seed production with adoption of improved/best agronomical practices.



ଡାଲିରେ ରୋଗ ପୋକ ନିୟନ୍ତ୍ରଣ ପାଇଁ ତାଲିମ

(ODIA NEWS PAPER - SAMBAD)

ହରଡ଼ ଫସଲରେ ରୋଗ ପୋକ ନିୟନ୍ତ୍ରଣ ତାଲିମ ଶିବିର

TRAINING CAMP HELD

(NATIONAL ENGLISH NEWS PAPER, ODISHA EDIT)

(ODIA NEWS PAPER - DHARITRI)

ଡିପ ଜମିରେ ସୁନାର ଫସଲ

THE SAMAYA — ODISHA'S PREMIER COLOUR DAILY

BHUBANESWAR — SUNDAY, 17 FEBRUARY 2013

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ହରଡ଼ ବିହନ ଉତ୍ପାଦନରେ ଲାଭ

(translated from Odia to English)

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District Co-ordinator, Bhawanipatna, Kalahandi — Secretary, LOKSEBAK

SAMBAD

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ଶଙ୍କର ଚାଷ ତାଲିମ ଶିବିର

ଗ୍ରାମ ସ୍ୱରାଜ ଅଭିଯାନ

(DAILY ODIYA NEWS PAPER(SAMBAD) PUBLICATION)

BLOCK LEVEL TRAINING PROGRAMME ON INTER CULTURAL MANAGEMENT PRACTICES,IPM AND IDM IN PIGEONPEA.

BLOCK- KANTAMAL DATE- 29-10-2014

ଫସଲରେ ରୋଗ ପୋକ ପରିଚାଳନା ନେଇ ଶିବିର

ODIYA NEWS PAPER (DHARITRI) PUBLICATION

BLOCK LEVEL TRAINING PROGRAMME ON IPM/IDM IN PIGEONPEA

BLOCK-RAYAGADA, DATE-17-10-2014

ORGANISED BY-ICRISAT

ହରଡ଼ ଫସଲରେ ରୋଗପୋକ ପରିଚାଳନା ନେଇ ତାଲିମ

(DAILY ODIYA NEWS PAPER(DHARITRI) PUBLICATION)

BLOCK LEVEL TRAINING PROGRAMME ON INTER CULTURAL MANAGEMENT PRACTICES,IPM AND IDM IN PIGEONPEA.

ଓଡ଼ିଶା ଭାସ୍କର

ODISHA BHASKAR

କୃଷିକ୍ଷେତ୍ରରେ କ୍ଷୁଦ୍ରଚାଷୀଙ୍କ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଭୂମିକା ରହିଛି : ଡଃ ମୁଲା

(Translated from Odia to English as below)

IN AGRICULTURE SMALLHOLDER FARMERS PLAY IMPORTANT ROLE: DR MULA

ସମ୍ବଲପୁର

ତିନାକୀଙ୍କ ସାମାଜିକ ସମ୍ମିଳନୀ

କୃଷି ବୈଜ୍ଞାନିକ ସମ୍ବର୍ଦ୍ଧିତ

CMYK

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ହରଡ ଚାଷ ତାଲିମ ଶିବିର

(DAILY ODIYA NEWS PAPER(SAMBAD) PUBLICATION)

BLOCK LEVEL TRAINING PROGRAMME ON INTER CULTURAL MANAGEMENT PRACTICES,IPM AND IDM IN PIGEONPEA.

BLOCK-RAMNAGUDA,DATE-20-10-2014

b. International News Articles (ICRISAT Happenings Newsletter)

ICRISAT
Happenings
Newsletter

9 January 2013
No. 1697

Odisha Government extends ICRISAT pigeonpea project for four years

(Left) Senior officials of the Government of Odisha at the ICRISAT stall. (Right) Farmers from 10 districts of Odisha examining pigeonpea varieties on display

The success and impact of ICRISAT's pigeonpea seed systems project has prompted the state government of Odisha, India, to extend the project to three new districts (Ganjam, Gajapati and Koraput) of the state over the period 2015-2018.

The 'Introduction and Expansion of Improved Pigeonpea Production Technology in Rainfed Upland Ecosystems of Odisha' had been implemented in five districts (Rayagada, Kalahandi, Nuapada, Bolangir and Boudh) of Odisha state during the period 2011-2014.

Acknowledging ICRISAT's contribution, the Department of Agriculture and Food Production, Government of Odisha, invited ICRISAT to put up a stall showcasing new and improved technologies beneficial to smallholder farmers at an agricultural fair at Berhampur, Ganjam district, Odisha.

Pigeonpea in demand at agri fair

One of the major attractions at the ICRISAT stall was the unpolished pigeonpea dal sold in 500 g and 1 kg packs by NGO partner Lokseba from Bhawanipatna, Kalahandi district. There was high demand and over 1,000 kg of dal was sold at the fair.

A team headed by Mr Sanat Kumar Tripathy, State Coordinator, put up the stall where samples of pigeonpea plants with pods of different varieties/ hybrids and informative print material developed by ICRISAT were displayed.

The stall was visited by a large number of farmers from 10 districts of Odisha and government officials including Mr Pradeep Kumar Mahanthy, Minister of Agriculture, Government of Odisha; Mr Rajesh Verma, Principal Secretary, Department of Agriculture and Food Production; Mr Aparti Sethy, Additional Director of Agriculture; and Mr Saroj Kanta Das, Deputy Director Agriculture (Pulses).

For more information on pigeonpea visit http://exploreit.icrisat.org/page/pigeonpea/987. ■

The project partners were Department of Agriculture and Food Production, Odisha; Odisha State Seed and Organic Product Certification Agency; and NGOs Sahabagi Vikash Abhiyan, Lokseba, People's Forum, Shramika Shakti Sangha and Centre for Social Action and Tribal Development.

The project is funded by the Government of Odisha under the Rashtriya Krishi Vikas Yojana scheme and was undertaken as part of the CGIAR Research Program on Grain Legumes.

ICRISAT
Happenings
In-house Newsletter

12 September 2014
No. 1648

"Women farmers are the unsung heroes of Agriculture. They are the beacons of hope," Dr William D Dar said in his address at the Women Farmers Day.

ICRISAT awards outstanding women farmers in India

Recognizing the contribution of women to agriculture is critical to achieve global food security, said Dr William Dar, Director General, ICRISAT.

Addressing over 1500 women farmers from across 12 states of India at the Women Farmers Day at the ICRISAT global headquarters, Dr Dar stressed that with "women farmers as the backbone of agriculture, and meeting their needs equals a better world."

The ICRISAT Women Farmers Day is a celebration of the achievements of India's outstanding women farmers whose ingenious and resourceful ways have placed them at the forefront of the fight against poverty, hunger, malnutrition and environmental degradation.

Of the 2 billion smallholder farmers in the developing world producing majority of the world's food, 70 per cent are women, mostly living in extreme poverty. "If we are to eradicate hunger and poverty, we need to level the playing field by economically empowering women farmers," Dr Dar continued.

He added that a UN study showed that empowering women farmers with new technologies and resources could result in yield increases by 20-30% and reduce the number of hungry people in the world by 100 to 150 million people.

ICRISAT regularly conducts Farmers Days to share new technologies, best practices and information about science-based innovations to benefit the farmers. The Women Farmers Day was held this

to page 2 ... ▸

ICRISAT
Happenings
Newsletter

27 March 2015
No. 1669

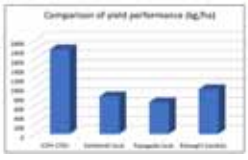
Indian state of Odisha gets its first hybrid pigeonpea

The State Varietal Release Committee (SVRC) of Government of Odisha released its first improved pigeonpea cultivar, ICPH 3762, in the name of Goddess Pārbati. The release of this hybrid has given hope to smallholder pigeonpea farmers in the State to enhance their income and livelihood. According to Dr Myer Mula, Scientist, Seed Systems, ICRISAT, three more pigeonpea lines as varieties for Odisha are ready for release by yearend.

Highlights of Pārbati (ICPH 3762)

- It is a mid-late duration hybrid and takes around 180 to 190 days to mature
- Average yield under normal conditions is 1.8 t/ha
- Suitable for cultivation in almost all agro-climatic conditions of Odisha
- Highly resistant to fusarium wilt and sterility mosaic disease
- Tolerant to terminal drought due to deep root system
- Pest load is comparatively low
- The seed is brown in color with medium bold seed size (11 g) and is preferred by millers
- Possess acceptable dal quality and high milling recovery (>75%).

ICPH 3762 recorded 125% increase in yield over local types. This hybrid also possesses complete resistance against wilt and sterility mosaic diseases. It was tested in 72 locations in five major pigeonpea growing districts of Odisha.



This work was part of the Tropical Legumes II project funded by the Bill & Melinda Gates Foundation. Funding was also received from Department of Agriculture, Government of Odisha through the Rashtriya Krishi Vikas Yojana (RKVY) project.

Pigeonpea is an important rainfed crop in Odisha state cultivated in 150,000 ha. Wilt and sterility mosaic disease are endemic in the state. Until now, the state did not have any improved cultivar (either variety or hybrid) released for cultivation. Farmers cultivated local landraces and varieties available in the market which resulted in low productivity and less income.

More on pigeonpea see http://exploreit.icrisat.org/page/pigeonpea/987.

Partners: Odisha University of Agriculture and Technology; ICRISAT

NGOs – Lokseba, People's Forum, Sahabagi Vikas Abhiyan, Shramika Shakti Sangha, Centre for Social Action and Tribal Development. ■

Pigeonpea hybrids released by SVRCs in India
2010 – ICPH 2671 – Madhya Pradesh
2012 – ICPH 2740 – Andhra Pradesh (undivided)
2015 – ICPH 3762 – Odisha

ICRISAT
Happenings
Newsletter

28 November 2014
No. 1651

ICRISAT scientists honored

Dr Hari D Upadhyaya, Director, Genebank, ICRISAT was awarded the 2014 International Service in Crop Science Award by the Crop Science Society of America (CSSA) on 3 November in Long Beach, California, USA. The International Service in Crop Science Award recognizes creativity and innovation in bringing about specific changes in practices, products and programs in the crops area at the international level. Dr Upadhyaya is a practical plant breeder and has developed a large number of early-maturing, high-yielding, drought tolerant, and diseases and aflatoxin contamination resistant groundnut breeding lines. Till date, 31 such breeding lines have been released as 44 cultivars in 22 countries, contributing to food and nutritional security in these countries, where these are cultivated in large areas benefiting

Dr Ch N Reddy (left) with Dr Y Chengguang.

Dr Upadhyaya (center) with Drs William Dar and CLL Gowda.

farmers immensely. ICRISAT Director General Dr William Dar congratulated Dr Upadhyaya and said "The recognition of your high quality science and your contributions globally are making us proud". Dr CLL Gowda, Deputy Director General-Research, ICRISAT and Dr Sanjaya Rajaram, the 2014 World Food Prize Laureate, also congratulated Dr Upadhyaya on receiving the honor. "With this award Dr Upadhyaya is one of the most decorated scientists in the CGIAR system, having been awarded the Fellow of American Society of Agronomy (2008) and Crop Science Society of America (2009), and Frank N Meyer Medal and Crop Science Research Award in 2013," Dr Gowda said.

Dr Ch Ravinder Reddy, Senior Scientist - Technology Exchange, Research Program - Dryland Cereals, received the Distinguished Scientific Achievement Award from Dr Yao Chengguang, the President of Liaoning Academy of Agriculture Sciences, PR China. Dr Reddy was honored for his contribution to two projects in China, 'Grain sorghum value chain for poultry feed' and 'Sweet sorghum ethanol value chain for production of ethanol'. Both projects established market linkages between small-scale farmers and industry and input supply chain management to enhance production and productivity.

Dr Myer G Mula, Scientist - Seed Systems, Research Program - Grain Legumes was recognized for his contributions in pigeonpea seed system improvement, at the Special Felicitation Function that was organized by the local NGO, LOKESEBAK, held at Bhawanipatna, Odisha, India. Dr Mula was presented with the Plaque of Recognition by the Chief Guest, Mr Lakshman Kumar Palata Singh, Deputy Director of Agriculture, Kalahandi District, Odisha.

The four year project 'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha' focused on the concept of seed system in order to sustain the availability of quality seeds to farmers. Pigeonpea is mainly grown on rainfed upland areas and is one of the most important pulse crops. ■

Dr MG Mula with Mr Lakshman Kumar Palata Singh (left), Deputy Director of Agriculture, Kalahandi, Odisha.

ICRISAT
Happenings
In-house Newsletter
14 February 2014
No. 1610

Farmer partner on pigeonpea seed production in Odisha, India receives top honor

Mr Pradip Kumar Panda, a progressive farmer cooperator under ICRISAT's "Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha" project was honored with the India Agriculture Minister's "Krishi Karman Award for Progressive Farmers" on 10 February.

Mr Panda received the award from the Honorable President of India, Mr Pranab Mukherjee during the inaugural ceremony of the World Agroforestry Congress 2014 at Vigyan Bhavan in New Delhi. Mr Panda of Antamoda village, Rayagada district, Odisha owns 17 hectares of land on which he cultivates paddy, cotton, pigeonpea and maize.

This award was in recognition of his involvement in 2011-2012 cropping season as seed producer of ICRISAT line ICP 8863 (Maruti). He was also the recipient of the Odisha Best Farmer Award on Pigeonpea last March 2013. In 2013-2014 cropping season, he increased his area to 14 ha (some leased) to produce foundation seeds of Maruti. His field has been used as demonstration site for farmers from other districts, as well as for projects such as the Tropical Legumes II. ■

ICRISAT
Happenings
In-house Newsletter
14 March 2014
No. 1614

Pigeonpea cultivation improving livelihoods of farmers in Odisha, India

Pigeonpea farmers in the Indian state of Odisha are experiencing a significant 70% increase in yield by using ICRISAT improved varieties over the traditional landrace. This in turn has resulted in about 90% increase in income levels.

Participants of the workshop at the newly inaugurated godown in Bhawanipatna.

In the past year, a total of 620,000 kg of various certified seeds of farmer preferred varieties and hybrids were produced from the seed production component of the project 'Introduction and Expansion of Improved Pigeonpea Production Technology in Rainfed Upland Ecosystem of Odisha' funded by the Government of Odisha under the Rashtriya Krishi Vikas Yojana (RKVY) sub-scheme and is being implemented in Rayagada, Kalahandi and Nuapada districts.

The highlights of the 2013-2014 crop season were presented at a workshop held in Bhawanipatna, Kalahandi on 4 March. A total of 70 participants including five Deputy Directors of Agriculture (for Rayagada, Kalahandi, Nuapada, Boudh and Bolinger districts), agricultural technicians, non-government organizations, ICRISAT staff and farmers attended the Orientation and Planning Workshop for 2014-2015 to map the way forward.

Participants of the workshop deliberated on seed procurement of 78 tons of various seed classes (Foundation, Certified and Truthfully-Labelled seeds) of ICP 7035, ICPL 88039, Asha, Maruti, ICPH 2671 and ICPH 2740 to cover the target production area of 10,000 hectares for the year. The project's mid-term assessment study was also presented.

ICRISAT's Dr Myer Mula and Mr Vijaya Kumar inaugurated godowns in Bhawanipatna, Kalahandi and Rayagada. Mr K Hanmanth Rao, Manager of Farm Services, ICRISAT, made a presentation on godown management. Part of the godowns will also serve as offices for ICRISAT staff assigned in the area for ease in project monitoring. Mr Surat Tripathy (State Coordinator) presented the 2013-2014 cropping season accomplishments.

This project is being undertaken under the CGIAR Research Program on Grain Legumes. ■

ICRISAT
Happenings
In-house Newsletter
28 February 2014
No. 1612

Season-long training on pigeonpea seed production and management concludes

As part of the institute's capacity building initiatives, seven technical staff from ICRISAT based in the state of Odisha, India and one representative of a non-governmental organization (Loksebak) were successfully trained in pigeonpea sowing, harvesting (seed to seed) and improved crop management techniques at the ICRISAT headquarters.

Under the project 'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystem of Odisha', the participants took part in a two-day training session every month from July 2013 to February 2014.

The 'season-long training' followed the crop production cycle, and the participants' feedback was collected in monthly reports and presented to ICRISAT's Dr Myer G Mula, Training Coordinator and Principal Investigator of the project. Improved crop management was adopted during the production cycle.

Dr MG Mula inspecting pigeonpea crop along with the participants of the training program.

The trainees included: Surat Kumar Tripathy (State Coordinator), Santosh Kumar Mohanty (Rayagada and Boudh District Coordinator), Yashobanta Naik (Nuapada and Balangir District Coordinator), Purna Singh (Kalahandi District Coordinator), Raj Kishore Panda (Nuapada Field Attendant), Tangudu Chandrasekhar (Rayagada Field Attendant), Hansaraj Bhoi (Kalahandi Field Attendant), and Ajit Prasad Mohanty (Loksebak). The activity was undertaken as part of the CGIAR Research Program on Grain Legumes. ■

ICRISAT Happenings
Science with a human face
In-house Newsletter

International Crops Research Institute for the Semi-Arid Tropics

29 January 2013 — No. 1555

Dal machines turned over to Odisha partners

A dal mill being turned over to Lokshak (NGO) at Bhawanipatna, Kalahandi.

As part of ICRISAT's mission of empowering smallholder farmers to escape from poverty through inclusive market-oriented development, two sets of dal machines were inaugurated and turned over to partners in Odisha on 15–16 January, under the project "Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha." Dr Myer Mula and Mr Sarat Tripathy of ICRISAT presided over this activity.

The partners, Maa Tarini Self-Help Group (with 10 women members) of Kalyansinghpur, Rayagada and Lokshak, a nongovernment organization (NGO) in Bhawanipatna, Kalahandi have borrowed Rs 130,000 (US$3,000) and Rs 220,000 (US$5,000), respectively to construct buildings to house the dal mills. Meanwhile in Khariar, Nuapatna, the dal mill building constructed by Suhabhagi Vikash Abhiyan (NGO) is ready for occupation. The cost of each dal mill set (comprised of dal mill machine, polisher, and generator) provided by the project is Rs 230,000 (US$5,100).

During the activity, Dr Mula also monitored the production of foundation and certified seed of improved varieties (Manuthi, Asha, Kamica, and ICPL 88039); hybrid seed production of ICPH 2671 and 2740 (Asha); and farmer-preferred varietal selection (FPVS) in the two districts. It is estimated that 2,000 quintals (200 t) of good quality seeds will be produced and procured for the 2013–2014 cropping season by the project and by the State Seed Corporation of Odisha. The production areas have been inspected and certified by the Odisha State Seed and Organic Product Certification Agency (OSSOPCA). ■

ICRISAT Happenings
In-house Newsletter

29 March 2013
No. 1564

ICRISAT participates in Odisha Agricultural Trade Fair

Visitors at the ICRISAT stall during the agricultural exhibition-cum-trade fair held in Chandrasekharpur, Bhubaneswar.

A variety of ICRISAT's pigeonpea varieties, hybrid seeds, plants, and project accomplishments and activities including those of the Kothapally watershed were put on show at the state-level Krishi Mahotsav, an agricultural exhibition-cum-trade fair held in Chandrasekharpur, Bhubaneswar, Odisha on 19-22 March.

ICRISAT was allotted an exclusive booth where it displayed activities conducted as part of the project on 'Introduction and Expansion of Improved Pigeonpea Production Technology in Rainfed Upland Eco-Systems of Odisha' with financial support from Rastriya Krushi Vikash Yojna (RKVY).

Over 1000 leaflets (Effective and Efficient Seed Production of Pigeonpea Hybrid/Variety), 300 booklets (Integrated Pest Management and Integrated Disease Management of Pigeonpea), and 250 booklets (Cultural Management Practices of Pigeonpea) in the local language Oriya were distributed to stakeholders. Value-added products like pigeonpea dal (in 0.5 -1 kg packs) prepared by women's self-help groups of Kalahandi and Rayagada using the dal mill supplied by the project were also displayed. About 1,400 kg of dal was sold from the ICRISAT stall.

The fair was inaugurated by Odisha Chief Minister Mr Naveen Patnaik. Mr RS Gopalan, Director of Agriculture and Food, spoke on the occasion. The annual fair conducted by the Government of Odisha through its Department of Agriculture, saw 357 booths showcasing products and machinery from public and private institutions.

Among those who participated were State coordinator Mr Sarat Kumar Tripathy (ICRISAT), and District Coordinators Mr B Sahu (Kalahandi), Mr Y Naik (Nuapatna) and Mr S Mohanty (Rayagada). ■

(Left) Visitors buying pigeonpea dal and (right) watching a video at the stall.

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International Crops Research Institute for the Semi-Arid Tropics

4 May 2012 — No. 1517

Odisha pigeonpea project evaluation and planning workshop held

A meeting and an Orientation and Planning Workshop of the project on 'Introduction and expansion of improved pigeonpea (arhar) production technology in rainfed upland ecosystems of Odisha' were held at the Directorate of Agriculture and Food Production, Bhubaneshwar and in Bhawanipatna, Odisha on 19 and 26 April, respectively.

The meeting at Bhubaneshwar was chaired by Director RS Gopalan together with his Deputy Director Saroj Das. Present during the meeting were the three Deputy Directors of Agriculture (DDAs) of Nuapatna, Rayagada, and Kalahandi; NGOs (LOKSEBAK and SVA), KVK-Umarkote; three district coordinators and State coordinator; seed certifying agency; and Dr MG Mula and Mr RV Kumar from ICRISAT.

During the open forum, Dr Gopalan recommended an adjustment of the 2012 targets as an offshoot of the 2011 results. This entails a reduction in improved pigeonpea production technology (IPPT) sites from 6000 ha to 4000 ha; inclusion of Boudh and Bolingir districts in the project; reduction of the IPPT site in Rayagada from 1500 ha to 500 ha; fertilizer subsidy in the seed production component of the project; institutionalizing seed delivery system in the project to sustain pure quality seeds of farmer preferred varieties and hybrids; and hiring 15 field assistants.

Meanwhile, the Orientation and Planning Workshop was participated in by 65 project implementers involving four DDAs (Kalahandi, Nuapatna, Rayagada and Bolinger) with their agricultural officers, KVK Nuapatna, NGOs (LOKSEBAK and SVA), OSSOPCA (Central Seed Certification Officer and staffs), 15 newly-hired field assistants, district coordinators, State coordinator, and ICRISAT scientists.

Participants of the Orientation and Planning Workshop held in Odisha.

Prior to the planning workshop, Dr Mula presented the 2011 project accomplishments and targets for 2012. The main output of the workshop was to schedule the delivery of seeds in the sites covering 15 blocks in five districts (Nuapatna, Kalahandi, Rayagada, Bolinger, and Boudh) for the sowing of 4,000 hectares of IPPT; 1,000 hectares for certified seed production; 186 hectares for foundation seed production; 40 hectares for hybrid seed production; and 42 hectares for farmer participatory varietal trials (FPVT). The workshop came up with specific schedules for the purchase and delivery of seeds and fertilizers to meet the scheduled sowing before 15 June. Fertilizers will be subsidized by the project only under the seed production and FPVT component of the project. ■

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International Crops Research Institute for the Semi-Arid Tropics

15 June 2012 — No. 1523

Odisha farmers trained on pigeonpea seed production

Participants of the training program in Odisha.

Under the project "Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha," ICRISAT staff headed by Dr Myer G Mula and Mr Sarat Kumar Tripathy facilitated the conduct of the training program 'Pigeonpea Seed Production and Management' on 5-7 June for the farmer seed growers of Odisha.

The one-day training was participated in by 301 farmer seed growers from 3 districts (Rayagada – 100; Kalahandi – 83; and Nuapatna – 116), as well as 11 from nongovernment organizations (Lokshak – 4; SVA – 3; 15 field assistants from five districts (Rayagada – 3; Kalahandi – 6; Nuapatna – 4; Bolinger – 1; and Boudh – 1); 3 District Coordinators, 20 District Agricultural Officers and Technicians of the Department of Agriculture (Rayagada – 2; Kalahandi – 11; Nuapatna – 5), and a Seed Certification Officer (Rayagada), totaling to 351 participants.

The training aimed to enhance farmers' knowledge and prepare and provide them with guidelines in seed production prior to sowing which starts on 15 June. For this year's cropping season, a total of 1,226 hectares will be covered with 1,000 hectares of Asha and Manuti for certified seed production; 186 hectares for foundation seed production (Asha, Manuti, ICP 7035, and ICPL 88039); and 40 hectares for hybrid seed production (ICPH 2671 and ICPH 2740). ■

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22 August 2014
No. 1637

Members of the RKVY team visiting a pigeonpea farm at the ICRISAT headquarters.

Pigeonpea improves women's participation and enhances livelihoods

Introduction of Improved Pigeonpea Production Technology (IPPT) in the state of Odisha, India, has increased women's participation by 34%, more than doubled net incomes from ₹5,019 per ha to ₹11,941 per ha, and enhanced productivity from 522 kg per ha for the landraces to 764 kg per ha for the improved varieties. Around 26,827 smallholder farmers, including 1,947 women, benefited from ICRISAT's interventions.

ICRISAT has been implementing the project 'Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha'. Funded by the Department of Agriculture and Food Production, Government of Odisha, India, through the Rashtriya Krishi Vikas Yojana (RKVY), the project was launched in August 2011. It is currently being implemented in five districts in the state – Rayagada, Kalahandi, Bolangir, Nuapada and Boudh. During the 3-year project period the benefit gained was ₹ 406 million against the total investment of ₹ 72.6 million, an increase of more than 400%. A spillover effect was also observed wherein farmers outside the intervention districts also adopted the technology.

In order to enhance the value chain, three village-level dal mills (including polisher and generator) and three spiral seed cleaners were supplied; and seed storage facilities enhanced with the construction of a 25 ton warehouse at Rayagada and a 100 ton warehouse at Kalahandi.

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2 November 2012 No. 1543

Pigeonpea training-cum-field exposure for Odisha field staff

(Left) Participants of the training-cum-field exposure held in Patancheru. (Right) At the hybrid seed production demo plot.

To strengthen the capacity on pigeonpea seed production and management of Odisha field staff under the "Introduction and Expansion of Improved Pigeonpea Production Technology in Rainfed Upland Ecosystem of Odisha" project, ICRISAT scientists conducted a training-cum-field exposure for 19 participants on 29-31 October at ICRISAT-Patancheru. The participants were exposed to the different methods of seed production of hybrids and varieties, identification and management of pests and diseases, operation of dal mill machine, and special topics on waterlogging and super early lines. A farmers' field visit was also organized to enable the participants to interact with farmers involved in seed production.

The activity was coordinated/attended by ICRISAT's Drs GV Rangarao, KB Saxena and MG Mula. ■

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17 February 2012 No. 1505

Orissa seed certification staff and entrepreneurs trained at ICRISAT

Participants of the training at Patancheru.

ICRISAT groundnut field visit.

A four-day training-cum-exposure visit was conducted for 12 seed certification officers and 4 seed entrepreneurs from Orissa on 13-16 February at ICRISAT-Patancheru. The training was part of ICRISAT's project on "Introduction and expansion of improved pigeonpea (Arhar) production technology in rainfed upland ecosystems of Orissa" with the Government of Orissa.

The delegation led by E Nandi, Chief Seed Certification Officer of the Orissa State Seed & Organic Products Certification Agency, was received by Director General William Dar and Research Program Director for Grain Legumes CLL Gowda.

In his welcome address, Dr Gowda emphasized on the importance of seed production systems in groundnut, chickpea, and pigeonpea. In his brief message, Dr Dar underlined the importance of "putting the mind and heart together" to ensure success in any endeavor. He also thanked the Government of Orissa for the ongoing partnership and for reposing trust in ICRISAT's contribution to the development of the State.

Dr Rosana Mula, Learning Systems Unit (LSU) Coordinator, presented the training and field/ laboratory visit rationale and objectives to the participants. ■

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3 April 2015
No. 1669

ICRISAT participates in Odisha state agriculture fair

L to R: Mr Sarat Kumar Tripathy, State coordinator, ICRISAT, Mr Gangadhar Das Joint Secretary I/C and Mr Basant Kumar Dey, Agronomist, Rashtriya Krishi Vikas Yojana Cell, Government of Odisha, at the ICRISAT stall that was put up at the Agri Fair organized by Department of Agriculture, Government of Odisha. The stall showcased new and improved varieties and technologies of chickpea and pigeonpea. About 535 farmers from 30 districts of Odisha visited the stall. ■

Processing and Post Harvest Facility

a. Dal Mil Processing

b. 25 MT Godown at Rayagada and Nuapada

c. 100 MT Godown at Bhawanipatna, Kalahandi

Project Monitoring

On-Farm/On-Station Demonstration

a. Pigeonpea in the rice-fallow cropping system

b. Chickpea in the rice-fallow cropping system

c. Sweet potato intercrop with pigeonpea

Conduct of Midterm Project Assessment

About ICRISAT

International Crops Research Institute for the Semi-Arid Tropics

ICRISAT is a member of the CGIAR Consortium

The **International Crops Research Institute for the Semi-Arid Tropics** (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, of whom 644 million are the poorest of the poor. ICRISAT innovations help the dryland poor move from poverty to prosperity by harnessing markets while managing risks – a strategy called Inclusive Market-Oriented Development (IMOD).

ICRISAT is headquartered in Patancheru, Telangana, India, with two regional hubs and six country offices in sub-Saharan Africa. It is a member of the CGIAR Consortium. CGIAR is a global research partnership for a food secure future.

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