



Cultivator to Seed Grower: A Process of Transformation-An Analysis Based on the Successful Pulse Production Programme

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India is a major Pulses growing country in the world (sharing about 38% of the area and 33% of the production). Pulses account for about one-fifth of the total acreage under food grains and about one-fifteenth of their production in the country. (Organization for Economic Cooperation and Development (OECD) and Food Agricultural Organization (FAO), 2021). Pulses play an important role in maintaining soil fertility by fixing free elemental nitrogen through the action of Rhizobia bacteria found in their root nodules. Pulses contribute significantly to soil fertility and provide a secret benefit to the soil. A little fertiliser factory exists inside every pulse plant. Growing pulses benefits the following crops, which are estimated to fix 20–40 kg of important nitrogen per hectare for free in the soil.

India is the largest producer and consumer of pulses in the world. As per latest data (as of February 2022) of the Directorate of Economics and Statistics, the production of pulses was 26.96 million (second advance estimates) in the financial year (FY) 2021-22, marking an increase of 16.5 per cent since FY 2016-17. The area under pulses was 29.15 million hectares in 2018-19, constituting 14 percent of the total area as per the latest estimates (Directorate of Economics and Statistics, 2021). In this period, the area under pulses has increased from 13.46 percent of total area to 14 percent of total area. As a result, government intervention in pulses production in order to enhance domestic production and productivity in pulses has assumed significance.

Schemes/projects on pulses development

The Indian Government's Department of Agriculture and Cooperation has been implementing plan interventions in the pulses sector since the Fourth Five Year Plan, with a more concentrated effort starting with the VI Plan. A centrally sponsored programme called "Pulses Development Scheme" was started from the IVth Plan (1969–1970 to 1973–1974). The introduction of improved cultivars and production technologies to farmers was the main focus. The National Pulses Development Project (NPDP), which was created during the seventh plan (1985–1990), combined all of the previous officially financed pulse programmes. A "Special Food Grains Production Programme (SFPP) on Pulses" was also conducted in 1988–1989 on a 100% Central assistant basis in order to complement the efforts under the NPDP. TMOP (1990–91): Mission expanded its purview to include pulse development initiatives. The TMO was then renamed as the Technology Mission on Oilseeds, Pulses, and Maize (TMOP&M). Centrally Sponsored Scheme on "National Food Security Mission" was introduced in 2007–08 to increase the output of rice, wheat, and pulses. During the XII Plan, NFSM + Special initiatives aimed to accelerate the production of pulses. It

involved a cluster demonstration approach and special initiatives for "pulses and oilseeds in dry land area".

Efforts have contributed to an increase in the production of pulses from 18.23 million tonnes in 2010-11 to 25.46 million tonnes in 2020-21, marking an increase of almost 40 percent. The average growth of pulses during the five year period 2016-17 to 2020-21 was estimated to be 10.89 percent. The important pulses grown in the major pulses producing states i.e. Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, Andhra Pradesh, Karnataka, Gujarat, Chhattisgarh and Bihar, are Gram, Arhar, Mungbean, Urdbean, Lentil, Peas and Horse gram. Though pulses are cultivated in India over a very large area and have been a traditional crop, there has been a fluctuating tendency in area, production and productivity of pulses from time to time.

Source: Compiled from various government documents

Rainfed upland transformed into golden harvest (Pulse scenario of Kalahandi district)

Kalahandi district in western Odisha, pulses are one of the main crops grown there. Approximately 85,000 hectares are used for pulse production, making well over 18% of the district's total net sown area. One of the most popular crops in kharif is pigeon pea, whereas green gram are cultivated in rabi. In addition to these, the farmers in the area also cultivate a variety of other pulses, including blackgram, lathyrus, field pea, Bengal gram, and horsegram.

In the years 2010–11, special Frontline demonstration utilising a scientific package of pigeon pea (Var.ICPL 87119). farming techniques was carried out in a small patch of Boria village of Kesinga. Farmers meeting was conducted and guidelines of the programme were explained, and in addition, technical assistance was rendered and beneficiaries identified through a formal selection process carried out by grass-roots extension workers who looked closely at the availability of cultivable farm resources. The demonstration was implemented in coordination with authorities from the State department, and at every stage of crop growth, farmers received technical assistance followed by field monitoring by the technical expertise of KVK. The frontline demonstrated beneficiaries could able to produce a yield of 12.0q/ha which is nearabout 25% increase over the existing cultivar.

A bumper crop was attained through a combination of field reconnaissance for pest and disease outbreaks, farmers' consultation, capacity building training and regular field inspection with the support of technical backstopping. By witnessing the potential yield of the crop neighbouring villages cultivated the variety which had a horizontal spread of 30 ha in the subsequent year.

Under NFSM (Pulses), the Pulse Seed Hub Programme was implemented in 2016–17 with an objective to harness pulse productivity to meet the quality seed requirement of the nation. under Odisha University of Agriculture & Technology, Bhubaneswara, 07 number Pulse seed hub centers were approved. KVK, Kalahandi is one of the districts that implemented the Pulse Seed Hub scheme in 2016-17.

The first time that the Odisha State Seed Corporation(OSSC) registered or identified pulse farmers of the Bhima Panipanchayat Group (Kesinga Block) as seed growers under the Pulse Seed Hub (PSH) scheme. Following the completion of formal procedures, farmer groups were registered in accordance with the government seed production program's proforma. The administration and financial operations of seed production, together with the dos and don'ts, were made transparent to farmers under the Pulse Seed Hub. Seeds variety under ten year old were selected for the programme. The groups paid for their own seed material purchases and followed Foundation seed production protocols. Beginning with the germination test, purity, chemicals used in seed treatment, line-sowing techniques, isolation

distance, significance of plant population per unit area, application of herbicides, weeding and hoeing, and spraying of plant chemicals, application of hormones, nipping techniques, roughing, scouting the field and other activities.

The activities were carried out by the close supervision of scientific personnel of KVK. Field inspections were conducted by Odisha state seed & organic products certification agency (OSSOPCA) officials during the crop period in order to assess crop condition and estimate crop yield visually. Strict precautions were taken to preserve the varietal purity of the seed during harvesting and threshing, as well as procedures for sorting other distinguished varieties. The harvesting methods were closely adhered to by the growers, and after products were transferred to the processing plant, further samples were taken for seed testing. The seed material was quickly sold to the State Seed Production Office as pre-conditioned after receiving the report, and the grower's account was credited with the amount of seed. This development process broaden their network, exchange knowledge, and learn about government initiatives of cultivating high-quality seeds.

The upland paddy fields were transformed into a pulse seed producing programme under the Pulse Seed Hub during a ten-year period. About 20 villages in the Kesinga block participated in the pulse seed hub scheme; the key locations for the programme were Boria, Nagupalla, Chicharla, Chanher, etc. The entire region is referred to as the district's "Pulse Hub," and it provides the government, private businesses, and regional growers with high-quality seeds.

Their lives had drastically changed as a result of the pulse seed production programme. These cultivators exemplified how to double agricultural profits in real life. Prior to the seed production programme, they had to rely on local vendors and traders to sell their harvest at a marginal price; now, they sell the output to the government at a predetermined price that was negotiated before the cropping season and is roughly double of the going rates in the area.

Case study in a nutshell

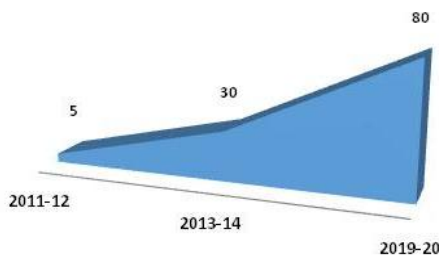
The majority of people in Kalahandi, an Odisha district populated by tribes, are employed in agriculture. In highland areas, paddy was the primary crop. Members of the Bhima panipanchayat group in Boria village were advised to cultivate a profitable non-paddy crop with the technical support of scientists. 2011–12 saw the completion of a special frontline demonstration on pigeonpea (ICPL 87119). Pigeon pea took the role of upland paddy. Seeing the potential for development and the disparity in income. Pigeon pea area horizontally expanded from 5 ha to 30 ha (with support from ICRISAT) The Indian government began the Pulse Seed Hub Programme in 2016–17 in an effort to increase pulse productivity. Farmers in the Bhima panipanchayat group showed a strong interest in choosing to produce seeds following the introduction of PSH. Farmers may now sell their crops for Rs 7000 instead of the Rs 3500–4000 they used to charge per quantity. Over a span of ten years, pigeon pea production has expanded to encompass over 80 hectares of land, including adjacent settlements. The specific location is now acknowledged as a hotspot for the production of pulses.

Organizational Framework: Roles & Responsibilities

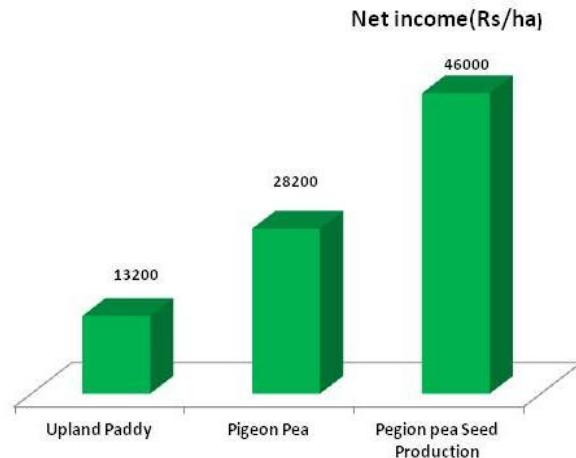
ICAR-ATARI	State Agriculture University	Krishi Vigyan Kendra	Govt. Agencies	Seed Grower
<p>Administrative protocol and implementation guidelines for the programme.</p> <p>Strict observation and assessment Programme reporting and documentation</p>	<p>Carry out the operational guidelines and problem solving system at institution level.</p>	<p>Conduct the activities through seed grower Interaction with stakeholders</p> <p>Decision making at ground level</p> <p>Timely liasoning with different institutions Capacity building and technical backstopping</p> <p>Ground level conflict resolution.</p> <p>Record the observation and synthesis the same for documentation</p>	<p>Seed registration by Seed Production Officer (SPO)</p> <p>Field inspection at regular interval by OSSOPCA</p> <p>Providing seed test report by OSSOPCA</p> <p>Co-ordinating field visit and handling management and technical issues.</p> <p>SPO's buyback policy</p> <p>Interdependency with grower and other stakeholders.</p>	<p>Supplying qualitative seeds</p> <p>Follow the guidelines of seed production</p> <p>Collective decision-making Communication</p> <p>sharing of knowledge and information</p> <p>Horizontal and vertical spread</p>



Horizontal Expansion of Area under Pigeonpea seed production ■ Area(ha)



Economics of Different crops in upland regions



Economics of Upland Paddy				Economics of Pigeonpea				Economics of Pigeonpea (Seed Production)			
Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net Return (Rs/ha)	Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net Return (Rs/ha)	Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net Return (Rs/ha)
22.0	12,100	25,300	13,200	12.0	20,000	48,000	28,000	10.0	30,000	76,000	46,000



Seed sowing & Germination



Seed Inoculation and method demonstration



Vegetative growth stage



Harvesting stage



Field visit of dignitaries



Threshing



Harvesting



Produce ready for processing



Mini Dal Processing unit of Bhima panipanchayat group



Seed processing and storing

A Process Documentation : Transformation journey from cultivator to seed Producer

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