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Demonstration of paddy variety GNV-10-89 for enhanced productivity and profitability under Tungabhadra command area farmers of Koppal District

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Abstract
Frontline demonstrations was conducted in farmers field by ICAR-Krishi Vigyan Kendra, Koppal (Gangavathi), Karnataka state on demonstration of paddy variety GNV-10-89 under Tungabhadra Command Area of Koppal District during *kharif* season of 2017-18 and 2018-2019. The data on yield and economics in demonstrated plots (GNV-10-89) were compared with farmer's practice (BPT-5204). The demonstrated plots were observed 13.56 per cent higher grain yield than farmer's practices. The extension gap, technology gap and technology index were 10.36 q ha^{-1}, 3.32 q ha^{-1} and 3.66 per cent, respectively. The lower cost of cultivation (Rs. 57,467 ha^{-1}), higher gross return (Rs. 1,62,651 ha^{-1}), higher net return (Rs. 1,08,117 ha^{-1}) and higher B:C (2.83) was observed in demonstrated plot as compared to farmers practice. Higher yield and returns due to reduced cost of cultivation, higher grain yield, and higher net returns in the demo plot over the farmer's practice created greater awareness about improved variety and motivated the other farmers to adopt in TBP farmers of Koppal district.

Keywords: Demonstration, paddy, GNV-10-89, Koppal

Introduction
Rice (*Oryza sativa* L.) is the most important staple food crop for more than two-thirds of the population of India and plays a significant role in national food security and a means of livelihood for millions of people. In India, rice occupies an area of 43.19 million hectare with a production of 110.15 million tonnes with an average productivity of 2550 kg per hectare (Anon, 2020) [1], which is almost half of the global average. In Karnataka state of India rice is grown over an area of 1.45 million hectare with an annual production of about 3.65 million tonnes with an average productivity of 2521 kg per hectare (Anon, 2020) [1].

The main reasons of low productivity and profitability in paddy are vagaries of nature, low fertilizer use efficiency and poor crop management practices including adherence of farmers to the traditional costlier practices, besides low market price of farm produce and non-availability of short duration varieties, low yield and higher incidence of pest and diseases (Dangi *et al*., (2017) [2].

Adoption gap could be minimized and yield could be enhanced through Front Line Demonstration (FLDs). FLD indicates demonstration of proven technologies which includes improved production technologies, high yielding varieties in farmer's field. By conduction of front line demonstrations on farmer's field there was significant increase in knowledge level of the farmers and majority of farmer's showed high level of satisfaction about demonstrated technologies (Raj *at el*., 2014) [6]. A vast gap has been observed between knowledge production and knowledge urtilization. Front line demonstrations on rice including recently released early maturing, high yielding, fine grained, diseased resistant varieties in farmers field may be helpful (Singh *et al*., 2015) [7].

In Koppal district, more than 39,000 hectares of land is under paddy cultivation during *kharif* season. Major problem identified were non-availability of short duration varieties, low yield and higher incidence of pest and diseases. By considering the above present demonstration was carried out to create awareness of high yielding varieties with short duration of paddy crop in Tungabhadra command area of Koppal district.

Materials and Methods

ICAR-Krishi Vigyan Kendra Koppal (Gangavathi) was conducted frontline demonstrations in two consecutive years during *kharif* seasons 2017-18 and 2018-19 at farmer's fields of Gangavathi block. The demonstrated technology of paddy variety GNV-10-89 as compared with BPT-5204 (Farmers practices). The agronomic practices were same followed in demo and farmer practices in FLD by KVK, Koppal during both the seasons in single locations with ten farmer's field. GNV-10-89 variety, is selection from the cross between GGV-05- 01. Grains were medium slender with 25-30 days earlier to BPT-5204. It has registered 16 per cent higher yield than check BPT-5204. The variety is tolerant to blast disease and recommended for *Kharif* season.

The demonstration of paddy varieties in the field is shown as in Fig 1 and 2. The data was collected from both demonstrated plot as well as farmer practices, grain yield and extension gap, technological gap, technological index along with the benefit-cost ratio were calculated.

Results and Discussion

Grain Yield

The grain yield of paddy was harvested accordingly by ICAR-KVK scientists. The grain yield from both the plots *i.e.*, demonstration and farmers' practices were compared and it was evident that an average yield of demonstrated plots was 13.59 per cent higher than that of farmer's practices (Table 1). The grain yield under demonstrated plots were 85.00 and 88.36 q ha^{-1} with an average of 86.68 q ha^{-1} from the year 2017-18 and 2018-19. However, it was 74.50 and 78.13 q ha^{-1} with an average of 76.31 q ha^{-1} under farmer's practice. The reasons behind the increase of yield under demonstrated plots might be due to growth and yield performance of GNV-10-89 and which ultimately increased the yield. The similar results were reported by Singh *et al.*, (2018) [5].

Table 1: Grain yield and gap analysis of FLDs and farmer practices

Year	Yield (q/ha)		% Increase yield	Extension gap (q/ha)	Technology gap (q/ha)	Technology index (%)
	Demo plot	Farmers practices				
2017-18	85.00	74.50	14.09	10.50	5.0	5.5
2018-19	88.36	78.13	13.09	10.23	1.64	1.82
Average	86.68	76.31	13.59	10.36	3.32	3.66

Extension Gap

An extension gap between demonstrated plot and farmers practices was calculated and average of extension gap of 10.36 q ha^{-1} was calculated (Table 2). This gap might be attributed to the adoption of improved variety of GNV-10-89 in demonstrated plots which resulted in higher grain yield than the farmers practices (BPT-5408). On the basis of the extension gap, the farmers were motivated to adopt the improved variety to reduce the extension gap and to increase their grain yield. The similar results were reported by Raju *et al*. (2012) [4].

Technology Gap

The recorded technology gap was 5.0 and 1.64 q ha^{-1} during 2017 and 2018 respectively. The average technology gap was found 3.32 q ha^{-1}. Higher technology index reflected the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology.

Economic Analysis

The demonstrated technology was observed lower cost of cultivation (Rs. 57,467 ha^{-1}) higher gross return (Rs. 1,62,651 ha^{-1}), higher net return (Rs. 1,08,117 ha^{-1}) and higher benefit cost ratio (2.83) on overage of both the years as compared to farmers practices (Table 2). Higher net returns which might be due to higher grain yield. The similar results were also reported by (Daniela *et al*., 2017) [3].

Table 2: Economic analysis in demonstrated plots and farmer practice

Year	Cost of Cultivation (Rs./ha)		Gross returns (Rs./ha)		Net returns (Rs./ha)		B:C	
	Demo	FP	Demo	FP	Demo	FP	Demo	FP
2017-18	56250	61200	153000	156450	96750	75250	2.72	2.55
2018-19	58685	62685	172302	152354	113617	89861	2.94	2.44
Average	57467	61942	162651	154402	108117	82555	2.83	2.49

Note: Demo-Demonstration plot, FP: Farmers practice

Fig 1 and 2: The demonstration of paddy varieties in the field

Conclusion

The demonstrated technology of improved variety of GNV-10-89 was observed higher productivity and profitability as compared to farmers practice (BPT-5204) in Tungabhadra Command Area Farmers of Koppal District.

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