

## Front Line Demonstration Trial of Barley Cv. Nurboo on Farmers Field in Cold Arid Kargil Region of J&K

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### ABSTRACT

*In the present study performance of barley variety Nurboo (SBL-4) against local check was evaluated through front line demonstrations conducted at farmer's field during kharif/ summer season of 2008, 2009 and 2010. A total of 54 demonstrations were laid on 5.0 ha area in 35 villages across 6 blocks of Kargil district. Sowing was done using residual soil moisture of snow melt from 15th April to 15th May every year. Package of practices as developed for the region were strictly followed. Recommended seed rate i.e. 250 kg ha<sup>-1</sup> against existing farmers practice of using 600 kg ha<sup>-1</sup> (local check) was broadcasted and nutrients i.e. N, P & K in the ratio of 100: 50: 40 kg ha<sup>-1</sup> were applied through DAP, MOP and Urea. The variety performed much better compared to local check and an average grain yield of 25.3 q ha<sup>-1</sup> was recorded which was 82.40% more than the local check. Straw yield also recorded an increase of 82.25% over local check. In spite of increase in yield both in grain and straw, technological and extension gaps existed which was 14.8 & 11.5 q ha<sup>-1</sup> respectively. The extension gap can be bridged by popularizing package of practices where in stress need to be laid on use of proper seed rate and balanced nutrient application. Economics of growing released variety of Barley Nurboo (SBL-4) recorded a net income of Rs. 58,087/- per hectare which is 191.79% more compared to net income from local check.*

**Key words:** Barley; Cold arid region; Yield; Yield gaps, Economics;

**B**arley (*Hordium vulgare*, L.) is cultivated since ancient times for several purposes like food grain, feed and fodder for cattle and breweries, in different parts of the world. Considering the extent of genetic diversity, Absinina seems to be the principal center of origin of hulled barley and Eastern Asia, particularly China, Tibet, Nepal Ladakh (India) as center of origin of hull-less barley (Sharma, 2002). In India major barley growing states are Uttar Pradesh, Rajasthan, Madhya Pradesh, Bihar, Haryana and Punjab (Singh, 1983). Jammu and Kashmir has diverse agro-climatic conditions ranging from sub-tropical to temperate cold desert. Barley in the state is grown in an area of about 10.2 thousand hectare (Anonymous, 2006-07). It is the major cereal crop of cold arid Ladakh region of Jammu & Kashmir and occupies about 10,000 hectares. Most of barley grown in the region is naked, locally known as "Grim while husked barley is also cultivated on very limited scale.

Kargil district is located between 320–360 N

latitude and 760-790 E longitude at an altitude ranging between 2,700 m to about 4,200 m above mean sea level with a total geographical area of 14,036 square kilometers. In Kargil district barley is traditionally grown as a kharif/summer crop unlike in other parts of the country where it is grown as a winter crop. Due to its short duration barley fits in the double-cropping situation and occupies an area of 5.500 thousand hectare with annual production of 99 thousand quintals at an average productivity of 18.0 q ha<sup>-1</sup> (Anonymous, 2009). It matures in less time than wheat and after harvesting facilitates the farmers to grow short duration crops like mustard and fodder crops to produce extra fodder for their cattle. In the region people are generally worried about fodder as they have to stall feed their cattle for about 7-8 months due to harsh winter. Fodder is a scarce commodity and fetches equally good price as that of grain in the region.

Barley is most preferred cereal crop in the cold arid Ladakh region and is consumed by people of all

ranks mainly in the form of sattu, flour, roasted grain as well as for making local beverage known as Chhang (Mir and Mir, 2000). Unfortunately use of local varieties and poor nutrient management results in very low yield. Keeping this in view barley variety Nurboo (SBL-4) with a potential grain yield of 40 and straw yield of 70 q ha<sup>-1</sup> (Sharma, 2002) was used under front line demonstrations so as to encourage farmers to adopt high yielding variety.

## METHODOLOGY

In the present study performance of barley variety Nurboo (SBL-4) against local check was evaluated through front line demonstrations conducted at farmer's field during kharif/summer season of 2008, 2009 and 2010. A total of 54 demonstrations were laid on 5.0 ha area in 35 villages across 6 blocks (Kargil, Gund Mangal Pore, Chickten, Drass, Sargole & Sankoo) of Kargil district. Soils of the study area are mostly sandy loam in texture with low nitrogen, medium phosphorus and high available potassium besides being slightly alkaline in nature. During the crop growing season minimum & maximum temperature extremes ranged between 5.9 °C to 14.2 °C and 14.7 °C to 33.4 °C, respectively. The region does not experience precipitation during the crop period. High velocity winds and long photoperiods are the other characteristics features of the area. Sowing was done using residual soil moisture of snow melt from 15th April to 15th May every year. Package of practices as developed for the region were strictly followed. Recommended seed rate i.e. 250 kg ha<sup>-1</sup> against existing farmers practice of using 600 kg ha<sup>-1</sup> (local check) was broadcasted and nutrients i.e. N, P & K in the ratio of 100: 50: 40 kg ha<sup>-1</sup> were applied through DAP, MOP and Urea. Total amount of P and K and half of N was applied as basal dose and the remaining 50% of N was top dressed in two equal splits at 21 & 55 days after sowing. In local check farmers apply only 100 kg N as basal application. First irrigation was applied at 21 days after sowing and further irrigations were given at 10 days interval in light of high evapo-transpiration and light textured soil conditions. One hand weeding at 30 days after sowing was done by farmers and fed to the cattle. Due to climatic conditions no pest infestation was observed over the years. Before harvesting final plant height (cm) was recorded. At harvesting five random samples of one meter square area from each demonstration fields were harvested and composite sample was weighed for total biological yield. After

weighing grains were separated by beating ear heads and cleaned grains were weighed for grain yield. Harvest index, technological gap, extension gap and technology index were calculated using following equations (Samui et al., 2009).

$$\text{Harvest index (\%)} = \frac{\text{Biological yield}}{\text{Grain yield}} \times 100$$

Technology gap = Potential yield - Demonstration yield

$$\text{Ext. gap} = \text{Demo. yield} - \text{Farmers' yield}$$

$$\text{Technology index (\%)} = \frac{\text{Technology gap}}{\text{Potential yield}} \times 100$$

## RESULTS AND DISCUSSION

Performance of barley variety Nurboo during different years from 2008 to 2010 in different blocks of Kargil region is depicted in Table 1. From the results of 54 front line demonstrations it is clear that, plant height recorded an average of 60.9 cm with maximum 64.2 cm recorded in G. M. Pore and minimum of 58.5 cm in Chickten block. Straw yield recorded an average of 59.7 q ha<sup>-1</sup> against an average of 32.4 q ha<sup>-1</sup> in local check, thereby recording an increase of 82.25% over local check. In different blocks yield of straw recorded a range of 56.9 to 64.7 q ha<sup>-1</sup>. Grain yield in SBL-4 recorded an average of 25.3 q ha<sup>-1</sup> against a potential yield of 40 q ha<sup>-1</sup>. Local check recorded an average yield of only 13.8 q ha<sup>-1</sup>. Yield varied in different blocks with maximum being recorded in G.M.Pore (27.4 q ha<sup>-1</sup>). There was no difference between harvest index (%) of Nurboo and local check and in fact both were at par recording a harvest index of 29.8% (Table 1) clearly demonstrates the superiority of Nurboo (SBL-4) over local check.

Data pertaining to total grain yield, yield gaps (Technological and Extension gaps) and Technology index (%) is presented in Table 2. Demonstration yield was recorded maximum in G.M. Pore block (27.4 q ha<sup>-1</sup>) where as on an average demonstration yield in Kargil region was 25.3 q ha<sup>-1</sup> an increase of 82.4% over local check, where in the grain yield harvested was only 13.8 q ha<sup>-1</sup>. Technological gap, which is the difference between potential and demonstration yield was maximum in Chickthen block (16 q ha<sup>-1</sup>) and lowest in G. M. Pore block (12.6 q ha<sup>-1</sup>). However, over all average technological gap in the region was 14.8 q ha<sup>-1</sup>. Similarly

**Table 1. Comparative performance of barley variety Nurboo (SBL-4) and local check under front line demonstration in cold arid conditions of Kargil**

Blocks of the District / Evaluation Parameters	Years	Kargil (09)*	G.M. Pore (05)	Chickten (06)	Drass (05)	Sargole (05)	Sankoo (05)	Total / Mean
No. of Demonstration	2008	04	04	03	02	03	03	19
	2009	03	03	03	02	02	02	15
	2010	05	04	03	03	03	02	20
	Total	12	11	09	07	08	07	54
Total Area (ha)		1.2	1.0	0.9	0.6	0.8	0.5	5.0
Plant height (cm)	2008	59.9	63.3	56.8	61.9	55.7	59.8	59.6
	2009	57.7	61.8	58.3	60.3	57.3	61.2	59.4
	2010	61.6	67.5	60.4	66.2	60.2	66.5	63.7
	Mean	59.7	64.2	58.5	62.8	57.7	62.5	60.9
Straw yield (q ha-1)	2008	59.8	66.4	56.5	58.3	54.1	63.6	59.8
	2009	53.6	62.4	54.7	56.2	55.9	59.7	57.1
	2010	58.8	65.8	58.9	59.7	60.6	69.8	62.3
	Mean	57.4	64.9	56.7	58.1	56.9	64.4	59.7
Grain yield (q ha-1)	Local Check	32.6	36.4	29.8	31.9	29.6	34.3	32.4
	2008	26.3	27.3	24.3	24.9	24.6	25.8	25.5
	2009	23.7	25.9	22.5	22.4	23.1	24.2	23.6
	2010	25.4	29.1	25.2	25.7	25.8	28.7	26.7
	Mean	25.1	27.4	24.0	24.3	24.5	26.2	25.3
Harvest Index (%)	Local Check	13.9	15.4	12.8	13.2	12.5	14.7	13.8
	2008	30.5	29.1	30.1	29.9	31.3	28.9	30.0
	2009	30.7	29.3	29.1	28.5	29.2	28.8	29.3
	2010	30.2	30.7	30.0	30.1	29.9	29.1	30.0
	Mean	30.5	29.7	29.7	29.5	30.1	29.0	29.8
	Local Check	29.9	<b>29.7</b>	<b>30.0</b>	<b>29.3</b>	<b>29.7</b>	<b>30.0</b>	<b>29.8</b>

\* Total number of villages in parenthesis

**Table 2. Yield, yield gaps and technology index of Barley variety Nurboo (SBL-4)**

Name of the Blocks (35)*	Potential grain yield (q ha <sup>-1</sup> )	Demonstration yield (q ha <sup>-1</sup> )	Local check yield (q ha <sup>-1</sup> )	% increase over local check	Technological Gap (q ha <sup>-1</sup> )	Extension Gap (q ha <sup>-1</sup> )	Technology Index (%)
Kargil	40.0	25.1	13.9	80.8	14.9	11.2	37.2
G.M. Pore	40.0	27.4	15.4	78.1	12.6	12.0	31.4
Chickten	40.0	24.0	12.8	87.5	16.0	11.2	40.0
Drass	40.0	24.3	13.2	84.3	15.7	11.1	39.2
Sargole	40.0	24.5	12.5	96.0	15.5	12.0	38.8
Sankoo	40.0	26.2	14.7	78.5	13.8	11.5	34.4
Mean	40.0	25.3	13.8	84.2	14.8	11.5	36.8

huge extension gap of 11.5q ha<sup>-1</sup> was recorded in the region with maximum extension gap being recorded in G. M. Pore and Sargole blocks (12.0 q ha<sup>-1</sup>). Extension gap indicates that there is a tremendous scope of extension activities in the region. Mass awareness through print and electronic media is the need of the hour. Package of practices for the crop as devised need

to be followed strictly particularly seed rate, optimum application of nutrients and other management practices. The recommended packages of practices will definitely increase the yield and subsequently reduce the extension gap. Technology index shows the feasibility of evolved technology at the farmer's field and lower the value of technology index more is the feasibility of the technology

**Table 3: Economics of Barley variety Nurboo (SBL-4) in Kargil district:**

Name of the Blocks (35)*	Cost of cultivation (Rs./ha)#				Gross income (Rs/ha)			Net income (Rs./ha)
	Seed <sup>1</sup>	Fertilizers <sup>2</sup>	Labour <sup>3</sup>	Total	Straw @ Rs. 1000/q	Grain @ Rs. 1000/q	Total	
Kargil	5,000	2,496	19,400	26,896	57,400	25,100	82,500	55,604
G.M. Pore	5,000	2,496	19,400	26,896	64,900	27,400	92,300	65,404
Chickten	5,000	2,496	19,400	26,896	56,700	24,000	80,700	53,804
Drass	5,000	2,496	19,400	26,896	58,100	24,300	82,400	55,504
Sargole	5,000	2,496	19,400	26,896	56,900	24,500	81,400	54,504
Sankoo	5,000	2,496	19,400	26,896	64,400	26,200	90,600	63,704
Mean	5,000	2,496	19,400	26,896	59,733	25,250	84,983	58,087
Local Check	6,000	893	19,400	26,293	32,400	13,800	46,200	19,907

\* Total number of villages in parenthesis.

# Cost of inputs per hectare:

1. Seed: Nurboo-250 kg @ Rs 20/ kg and local check 600 kg @ Rs 10/kg.

2. Fertilizers : -DAP 109 kg @ Rs.10.60/kg (demonstration) ; MOP 80 kg @ Rs. 5.60/kg (demonstration) , Urea 175 kg @ Rs 5.10/kg (demonstration & local check)

3. Mechanization & labour:- Land preparation @ Rs. 6000/ha, Two labours for sowing & basal fertilizer application @ Rs. 150/labour/day, 14 labours for 7 irrigations & 2 top dressing of urea @ Rs. 150/labour/day, 40 labours for harvesting of crop @ Rs. 150/labour/day, Threshing @ Rs 5000/ha

(Jeengar et al., 2006). Technology index in the present case varied between 31.4 to 38.8% and averaged 36.8% over six blocks of Kargil region. Table 3 gives the economics of growing SBL-4 (Nurboo) in the region. The data clearly indicates the advantage of growing released variety over local check. Since grain yield as well as straw yield is more in the variety used under front line demonstrations, therefore naturally income generated is also more. Total gross income from both grain and straw is Rs.84,983/- per hectare as against only Rs.46,200/- in the local check. Net income obtained under FLDs was Rs.58,087/- which was 191.79% more over the local check, where the net income was only Rs.19,907/- per hectare.

## CONCLUSION

State released variety of Barley Nurboo (SBL-4) performed better with an average grain yield of 25.3 q ha<sup>-1</sup> that was 82.40% more than the local variety. Technological and extension gaps existed which can be bridged by popularizing package of practices with emphasis on use of proper seed rate and balanced nutrient application. Replacement of local variety with the released variety would increase the production and net income of by more than fifty thousand rupees.

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