

Assessment of Green Fodder of Bajra Napier Hybrid in Terms of Availability, Milk Production and Entrepreneurship

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Abstract

Detail appraisal has been taken on a sample size of 200 dairy respondents on Bajra Napier Hybrid (B-N Hybrid) adopters to objectify the assessment of increased area under Bajra Napier Hybrid as green fodder, enhancement of milk productivity, increase duration of lactation period and opportunity of green fodder entrepreneurship among rural youth. All the adopters opined that adoption of B-N Hybrid technology has led to adequate availability of green fodder during scarcity period. Results revealed that B-N Hybrid was adopted by 88 per cent of the respondents which was nil earlier. Further, about 62 per cent of the respondents took second cutting in 40-45 days after first harvest. The campaign and availability of planting materials of B-N Hybrid not only increased the awareness among the farmers but also increased the adoption as well adequate availability of green fodder.

Keywords: Bajra Napier, Entrepreneurship, Fodder, Lactation Period, Milk Yield



Introduction

India ranks first among the world's milk producing nation (187.7mt), however, lack of quality green fodder become a major bottle neck in affecting milk productivity, lactation period and livestock health including fertility. Adequate availability of green fodder plays a key role in correcting infertility problem, enhancing milk productivity and finally improving economic prosperity of dairy enterprise (Birthal and Jha, 2005). As fodder and feeds constituents about 60% of the total cost of milk production (Kumar *et al.*, 2012), the cost of milk production can be significantly lowered by improving feeding system based on green fodder and replacing ingredient of concentrate with leaf meal and enriched complete feed block (Sunil Kumar *et al.*, 2012). India is endowed with 512.05 million livestock which is about 10.71% of the world livestock population and are reared on 2.29% of the land area of the world (Annual Report, 2018-19, DAC&FW, MOA&FW, Govt of India), though livestock population has increased up to 535.83 million in 2019. In comparison to the world's largest livestock population, the green fodder is being cultivated only on 8.4 million hectares (5.23%) of total cropping area in India, which is static since last two decades. Further, small operational land holdings with the marginal, small and semi-medium respondents (own about 87.7 % of livestock) are facing the major hurdles in increasing the area under forage crops. According to ICAR-Indian Grassland and Fodder Research Institute (vision 2050), the country faces a net deficit of 30.65 to 33.10% green fodder, 11.41 to 11.85% dry crop residues and 44% feeds. In order to meet out the deficit, green forage supply has to grow at 1.69% annually. Further, the same document stated that deficiency of feed and fodder accounts for half of the total loss of dairy followed by the problems of breeding and reproduction (21.1%), diseases (17.9%) and management (10.5%) for which collective measures have to be taken up to increase the availability of green fodder at field level.

Considering the problem of green fodder scarcity, the study was conducted to increase the green fodder availability, milk yield and to create entrepreneurship in fodder production by popularizing the Bajra Napier Hybrid (specifically CO-5 and CO-4 varieties) among the dairy farmer by effective extension strategies (YouTube video, radio talk, Doordarshan, newspaper, farm folder, Mobile App, workshop, training etc.). Further, imprinting success of B-N Hybrid in public domain has spread the awareness beyond the boundaries of Uttar Pradesh and 450 respondents from 12states, after watching YouTube video, demanded the planting materials of B-N Hybrid through phone calls and WhatsApp and planting materials were supplied through Indian postal services to the farmers of Manipur, Assam, Rajasthan, Bihar, Jharkhand.

Materials and Methods

A total of 0.86 million cuttings of B-N Hybrid were distributed to 727 farmers of 12 states (Uttarakhand, Delhi, Haryana, Rajasthan, Bihar, Jharkhand, Maharashtra, Manipur, Gujrat, Assam, Madhya Pradesh including Uttar Pradesh) by the ICAR-IVRI Izatnagar during 2017-18 and 2018-2019. The campaign using ICTs and other methods facilitated the diffusion of information about B-N Hybrid at national level. The data presented in this research are of 200 respondents selected randomly through the list of the farmers whom the cuttings of B-N Hybrid were distributed by ICAR-IVRI to analyze the fodder availability at farmers field, increasing milk yield level, lactation period and spread of B-N Hybrid technology from farmers to farmers. The relevant data were collected during August - October 2020 using semi-structured interview schedule, personal interview method, field observation. The data of the farmers of distant states were collected through telephone.

Results and Discussion

It was found that that majority of the respondents (51%) were cultivating the B-N Hybrid on 0.32 acre of area, followed by 37 and 12 percent of the respondents who were cultivating B-N Hybrid on 0.32 to 0.64 acre and on more than 0.64 acre of area (Table 1) after supplying the cuttings to them.

Table 1: Area coverage under B-N Hybrid cultivation for green fodder at field level

Area under Napier cultivation	Number of respondents (N=200)	Percentage
Up to 2 bigha (0.32 acre)	102	51
2-4 bigha (0.32-0.64 acre)	74	37
More than 4 bigha (0.64 acre)	24	12

The area increased under B-N Hybrid was resulted due to providing planting materials and technical advice to the farmers. As far as harvest of green fodder of B-N Hybrid is concern, majority (50 %) of the respondents took first harvest of B-N Hybrid at the 50-60 days after plantation and the second harvest was taken at 40-45 days after first harvesting, whereas third harvest was taken at 35-40 days after second harvesting, consequently by majority of the respondents i.e. 62 and 46 per cent of respondents, respectively as presented in Table 2 and the interval of harvesting was reduced in second and third harvest in comparison to first harvest. The findings are in conformity with Ramya *et al* (2017) who reported that first cutting of CO 4 & CO 5 varieties of B-N Hybrid to be taken at 60 days after plantation for better green fodder yield and nutrient content.

Table 2: Distribution of respondents according to the harvest of green fodder of B-N Hybrid

Days	Number of respondents (N=200)	Percentage
Days of first harvest of B-N Hybrid for green fodder		
50 -60 days	100	50
60-65days	82	41
After 65 days	18	9
Second harvest of B-N Hybrid for green fodder		
35 -40 days	42	21
40-45 days	124	62
Above 45 days	34	17
Third harvest of B-N Hybrid for green fodder		
35 -40 days	92	46
40-45 days	62	31
Above 45 days	56	23

The quantity of the green fodder was measured by counting the number of tillers, by the farmers, in a plant at the time of first, second and third harvesting of B-N Hybrid and likewise majority of respondents (50 % in first harvest, 46% in second harvest and 43 % in third harvest) reported 10-15 tillers, more than 50 tillers and more than 60 tillers/plant in first, second and third harvest, respectively (Table 3). The findings indicate that as the age of plants and number of harvesting increased, the number of tillers/plants were also increased which ensured higher yield and adequate availability of green fodder. Mukherjee *et al.* (2020) reported in their research that succeeding cuttings need be taken within 35 to 40 days interval otherwise delay in cutting reduces the quality of green fodder in terms of hardness and less succulent.

Table 3: Number of tillers/plant at different harvest of green fodder of B-N Hybrid

Number of tillers	Number of respondents (N=200)	Percentage
Number of tillers in first harvest of B-N Hybrid		
8-10 tillers	38	19
10-15 tillers	100	50
> 15 tillers	82	41
Number of tillers in second harvest of B-N Hybrid		
30-40 tillers	40	20
40-50 tillers	68	34
> 50 tillers	92	46
Number of tillers in third harvest of B-N Hybrid		
40-50 tillers	52	26
50-60 tillers	62	31
> 60 tillers	86	43

Regarding the green fodder yield, it was found that majority of the respondents (40%) harvested 40-50 tonnes of green fodder followed by 33 percent who obtained 31.25 to 40 tonnes of green fodder/ha at the first harvest of B-N Hybrid, whereas in second harvest, the yield of green fodder was 40-50 tonnes and 50-55 tonnes/ha as reported by 46 and 43 percent of the respondents, respectively. The green fodder was increased at farmers field in each harvesting as majority of the adopters (52%) obtained 50-55 tonnes of green fodder/ha and 41 percent obtained 55 to 62.6 tonnes of green fodder/ha in third harvesting (Table 4). AICRP on forage crops reported the yield of CO(BN)5, 1082q/ha/year (Babu *et al.*, 2014). It can be concluded that higher yield of green fodder was one of the factors towards adoption of B-N Hybrid by majority of the dairy farmers.

Table 4: Distribution of respondents according to the green fodder yield of B-N Hybrid / acre at different harvest

Fodder Yield (in quintal)	Number of respondents (N=200)	Percentage
Fodder yield at first harvest		
100-125 quintals	54	27
125-160 quintals	66	33
160-200 quintals	80	40
Fodder yield at second harvest		
125-160 quintals	22	11
160-200 quintals	92	46
200-220 quintals	86	43
Fodder yield at third harvest		
160-200 quintals	14	7
200-220 quintals	110	52
220-250 quintals	82	41

Further, all the respondents (100%) reported that adoption of B-N Hybrid cultivation ensured adequate availability of green fodder during scarcity period. Further, it was observed that due to the regular availability of sufficient green fodder for longer period of time, 95 percent of the dairy respondents reported increased milk productivity (Table 5) which is in conformity of the findings of Singh *et al.* (2018) who reported that enhancing green fodder availability for the milch animals by 7.33kg per day could increase the milk production by 22.76 per cent.

Table 5: Opinion of respondents about availability of BN Hybrid green fodder in scarcity period and its role in increasing milk production

Response	Number of respondents (N=200)	Percentage
Availability of green fodder		
Provide adequate green fodder	200	100
No adequate green fodder production	-	-
Increasing milk production		
Increased milk production	190	95
No increase in milk production	10	5

In the context of increased milk productivity due to adequate availability of green fodder of B-N Hybrid, 45 percent respondents reported 0.5 to 1.0 litre, 39 percent reported 0.5 litre and 16 percent of respondents reported the increase 'more than one litre' of milk yield/animals/day (Table 6). Regarding milk yield and green fodder, Mohini *et al.* (2007) reported that milk yield decreased by 7.0% in cattle when level of green fodder reduced by 10% with wheat straw in the ration. The continuous availability of green fodder even during scarcity period enhanced the lactation period up to one month as reported by 41 percent of the respondent whereas the lactation period of more than one month was reported by 32 percent of the respondents (Table 6). A research in Kerala found that feeding 15 kg of CO 4 grass increased milk yield by almost 200 ml/cow (Prabu, 2012) whereas another study reported that 20-30 percent of extra milk yield was solely due to the feeding of B-N Hybrid green fodder (ICAR, 2018).

Table 6: Distribution of respondents according to the increased milk yield and lactation period of dairy animals due to feeding of green fodder of B-N Hybrid.

Milk yield and lactation period	Number of respondents (N=200)	Percentage
Milk yield increase (litre/ day)		
Up to 0.5 litre	78	39
0.5-1.0 litre	90	45
>1.0 litre	32	16
Lactation period of dairy animals		
Up to 1 month	82	41
>1 month	64	32
Not reported	54	27

The availability of B-N Hybrid green fodder also reduced the expenditure on feeding of concentrate mixture as opined by 95 percent of the dairy farmer. Further, 15 percent of the respondents started entrepreneurship in cultivation of B-N Hybrid by selling the green fodder at the rate of Rs. 120-150/quintal to the dairies situated in urban and peri-urban areas. Further, to ensure the fodder availability during winter months as the growth of B-N Hybrid became stunted due to harsh winter about 65 percent of the respondents adopted intercropping of Barseem, Mustard, Makhan Grass and Oat with the BN Hybrid for continuous availability of green fodder (Table 7) which was the farmers innovation.

Table 7: Distribution of respondents according to reduced expenditure on feeding due to B-N Hybrid and intercropping practices in winter

Statement	Number of respondents (N=200)	Percentage
Reduced expenditure on concentrate feeding due to green fodder		
Reduction in cost of concentrate feeding	190	95
No reduction in cost of concentrate feeding	10	5
Entrepreneurship development in B-N Hybrid cultivation		
Entrepreneurship Developed	30	15
No Entrepreneurship was Develop	170	85
Intercropping Barseem, Mustard, Makhan Grass and Oat with B-N Hybrid in winter season		
Following inter cropping practices	130	65
Not following inter cropping practices	70	35

Spread of Green Fodder B-N Hybrid Technology among Dairy Farmers

As far as information sharing behaviour of the respondents is concerned, majority of the respondents (83%) shared the information about B-N Hybrid with other farmers as they were influenced by its adequate green fodder production. (Table 8). Further, 22.89 percent of the respondents shared the information up to 'two farmers' whereas 35.54 percent shared the information among '2 to 4 farmers' and majority of the respondents (41.55%) shared the information in 'more than 4 farmers'. Further, majority (43.37%) of the respondents have increased the area more than 0.26 hectare under B-N Hybrid cultivation due to farmers-to-farmers extension.

As far as the opinion of respondents is concerned, it was found that 89 per cent of respondents reported economical attributes of BN Hybrid in comparison with other fodder crops, 35 per cent reported that adequate availability of green fodder their dairy animals came in heat on right time, 92 per cent reported easily chaffed due to softness and succulent, 88 per cent reported that one tasak of B-N Hybrid is sufficient for one dairy animal, while more greenish, cultivation on bunds yield more green fodder were other good characteristics opined by the farmers.

Table 8: Dynamics of information sharing behavior and spread of B-N Hybrid technology among dairy farmers

Categories	Number of respondents (N=200)	Percentage
Information Sharing Behaviour		
Shared the information	166	83
Shared no information	34	17
Spread of B-N Hybrid technology farmer to farmers (N=166)		
Up to 2 farmers	38	22.89
2-4 farmers	59	35.54
> 4 farmers	69	41.55
Area increased under B-N Hybrid cultivation through farmer to farmer (N=166)		
Up to 2 bigha (0.32 acre)	41	24.69
2-4 bigha (0.32 to 0.64 acre)	53	31.92
More than 4 bigha (0.64 acre)	72	43.37

Further, effectiveness of Farm Yard Manure (FYM) in higher growth and more tillers/plant, early availability of green fodder by rooted slip plantation of BN Hybrid, solving green fodder scarcity, intercropping with barseem and mustard with BN Hybrid during winter and no infestation of insect & pest in BN Hybrid were the favourable opinion of the majority of the respondents (Table 9). Kadam *et. al.* (2017) reported that hybrid Napier could prove a better option due to its perennial nature and capacity to produce adequate green fodder round the year. Further, it was found that 6-7 cuttings/year produced 330 to 353 tonnes/ha/year green fodder with the average productivity of 55.0 to 58.8 tonnes/ha/cutting at field level. The finding is in conformity that expenditure on feed concentrate had gone down considerably after feeding green fodder of B-N Hybrid (ICAR, 2018).

Table 9: Opinion of respondents about B-N Hybrid as green fodder for their dairy animals (N=200)

Opinion of farmers	Yes (in%)	No (in%)
It is economical as compared to other fodder crop	89	11
Due to adequate availability of green fodder animal did not suffered of anestrus	35	65
It is easily chaffed because of its softness and succulent	92	8
One tasak of Napier is sufficient to a dairy animal	88	12
Entire plant is more greenish in comparison to other fodder crop	93	7
Cultivation on bund yield more fodder	91	9
Cultivation on bund save irrigation water	81	19
Application of FYM is more useful in higher growth, yield and more tillering	90	9
Plantation by roots slip results into early fodder availability	65	35
It has solved the green fodder scarcity	86	14
Inter-cropping of berseem, oat and mustard with B-N Hybrid during winter season results into continuous availability of green fodder	25	75
Infestation of insect & pest is nil	75	25

Conclusion

The adoption of B-N Hybrid by the dairy farmers has increased adequate availability of green fodder at field level. Besides creating the entrepreneurship of green fodder cultivation among the youth, the prolonged and adequate availability of green fodder fed to the milch animals also resulted into increased milk yield and lactation period. The Farmer to Farmer (F2F) extension approach played a magnificent role in facilitating the spread and adoption of B-N Hybrid technology and sharing planting materials among themselves. On the basis of the findings of this research it can be advocated that besides intensive extension work for awareness about B-N Hybrid technology for green fodder production, availability of critical inputs of technology to farmers, accessibility of technology among the farmers, continuous monitoring of the activities and follow up at farmers' field for backstopping of the technology, develop the confidence among the dairy farmers which have the resultant effect on economic prosperity of dairy

farming while minimising cost of milk production.

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Conflict of Interests

There is no conflict of interest.

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