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Evaluation of hybrid Napier in Panchmahals district of central Gujarat

B S KHADDA[1], KANAK LATA[2], J K JADAV[3], RAJ KUMAR[4] and A K RAI[5]

Krishi Vigyan Kendra- Panchmahals, Vejalpur, Godhra, Gujarat 389 340

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ABSTRACT

The present study was conducted in Godhra, Kalol and Ghoghmba talukas of Panchmahals district of central Gujarat, to popularize the improved green fodder production technology. Constrains in hybrid Napier production were identified though participatory approach. Preferential ranking technique was utilized to identify the constraints faced by the farmers in hybrid Napier production. The results revealed that lack of suitable high yielding varieties, lack of technical knowledge and less availability of irrigation water were the three most important factors which inhibited the adoption of HYVs of hybrid Napier in Panchmahals district of Gujarat. The yield of green fodder from hybrid Napier in demonstration was 970 q/h as compared local check (665 q/h). The percentage increase in the yield over local check was 45.86. Economic analysis of the yield performance revealed that front line demonstrations recorded higher gross returns (₹ 67 900/ha) and net return (₹ 40 500/ha) with higher benefit ratio (2.48) as compared to (2.03) local checks. Farmers mean knowledge score had increased significantly by 32.42 after implementation of frontline demonstrations. The impact of FLD was also analyzed which showed that there was significant improvement in knowledge level and satisfaction on the part of farmers.

Key words: Hybrid Napier, Frontline Demonstration, Production technology

Napier grass (*Pennisetum purpureum* Schum.) is also called as elephant grass due to its tallness and vigorous vegetative growth. The plant tiller freely and a single clump may produce more than 50 tillers under favourable climatic conditions. Unfortunately, the grass coarse textured, the blade leafs and sheaths hairy, leaf margins sharply serrated and less juicy and fibrous. In order to avoid these demerits, a cross was made between elephant grass and bajra (*Pennisetum typhoides* × *Pennisetum purpureum*) during the year 1953 in India which is more succulent, leafy, fine texture, palatable, fast growing and drought resistant. Hybrid Napier is a perennial grass which can be retained on field for 2-3 years. Compared to Napier grass, hybrid Napier produces numerous leaves. It has larger, soft and less persistent hairs of leaves. The stems are also less fibrous than Napier. The tillers are more numerous and grow faster. During recent years, Panchmahals district of central Gujarat has emerged as the leading district in milk production in the state. Farmers of area are preferring hybrid Napier for green fodder over all other crops owing to its adoptability with higher green fodder productivity. However, the productivity of hybrid Napier (green fodder) in the district is very low as compared to average state productivity. Lacks of suitable high yielding varieties, as well as poor knowledge about production practices are ascribed as main reasons for low productivity of green fodder. The productivity of green fodder per unit area could be increased by adopting recommended scientific and sustainable management practices using a suitable high yielding variety. In view of the above factors, frontline demonstrations were undertaken in a systematic manner on farmers' field to show the worth of a new variety and convince the farmers to adopt improved management practices of hybrid Napier production for enhancing productivity of green fodder. The study was aimed to find out yield, economics and factors (constraints) affecting the adoption of green fodder production technology of hybrid Napier.

MATERIALS AND METHODS

The present study was conducted in Godhra, Kalol and Ghoghmba talukas of Panchmahals district of Central Gujarat during 2009-2012. For popularization of the improved green fodder production practices and to find out the constrains in hybrid Napier production, PRA technique was used. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in hybrid Napier production. Farmers were also asked to rank the constraints perceived as limiting hybrid Napier production in order of preference. The quantification of data was done by ranking

[1] Subject Matter Specialist (e mail: khadda74@gmail.com), [2] Programme coordinator (e mail: kanak1966@redif.com), [3] Subject Matter Specialist (e mail: jksmskvk@gmail.com), [4] Subject Matter Specialist (e mail: rajhortches@gmail.com), [5] Subject Matter Specialist (e mail: ajayrai74@gmail.com)

the constraints and then calculating the Rank Based Quotient (RBQ) as per methods given by Sabarathanam (1988), which is as follows:

$$RBQ = \frac{\Sigma fi(n + 1 - ith)}{N \times n} \times 100$$

wherein, fi, number of farmers reporting a particular problem under i^{th} rank; N, number of farmers and n, number of problems identified.

Based on top rank farmers problems identified, front line demonstrations were planned and conducted at the farmers' field under FLD Scheme of Krishi Vigyan Kendra-Panchmahals. In all, 120 frontline demonstrations were conducted to convince farmers about potentialities of improved variety of hybrid Napier APBN 1, during 2009- 10 to 2012-13. All the participating farmers were trained on various aspects of hybrid Napier production technologies. Recommended agronomic practices and genuine slips of hybrid Napier were used for FLDs in 0.25 ha area/ demonstration. A one fifth area was also devoted to grow local standard check. To study on the impact of front line demonstrations, out of 120 participating farmers, a total of 60 farmers were selected as respondent through proportionate sampling.Production and economic data for FLDs and local practices were collected and analyzed. The technology gap and technology index were calculated using the formula given by Samui *et al.* (2000). For obtaining Technology Index. Technological Gap (Potential yield – Demonstration yield) was divided with Potential Yield multiplied by 100.

Knowledge level of the farmers about improved production practices of hybrid Napier before frontline demonstration implementation and after implementation was measured and compared by applying student't' test. Further, the satisfaction level of respondent farmers about extension services provided was also measured based on various dimensions like training of participating farmers, timeliness of services, supply of inputs, solving field problems and advisory services, fairness of scientists, performance of variety demonstrated and overall impact of FLDs.

The selected respondents were interviewed personally with the help of a pre-tested and well structured interview schedule. Client Satisfaction Index was calculated as developed by Kumaran and Vijayaragavan (2005).

The individual obtained score

$$\text{Client Satisfaction Index} = \frac{\text{The individual obtained score}}{\text{Maximum score possible}}$$

The data thus collected were tabulated and statistically analyzed to interpret the results.

RESULT AND DISCUSSION

Constraints in hybrid Napier production

Production problems of hybrid Napier faced by the farmers were documented in present study. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in hybrid Napier production. The ranking given by the different farmers are given in Table 1. A perusal of data indicates that lack of suitable HYVs was given the top most rank by 31 respondent farmers. The FLD participants were provided slips of hybrid Napier as critical inputs. Based on the ranks given by the respondent farmers for the different constraints listed out in Table 1, the rank based quotients were calculated and presented in Table 2.

Table 1 Ranks given by farmers for different constraints (n=60)

Production constraints	Ranks						
	I	II	III	IV	V	VI	VII
Lack of suitable HYVs	31	11	8	6	4		
Lack of technical knowledge	10	13	17	5	7	3	5
Low soil fertility	3	7	5	8	17	9	11
Lack of irrigation water	14	13	7	5	11	4	6
Problems of wild animals	11	9	12	10	5	5	8
Grass hopper infestation	8	9	14	10	5	5	9
Weed infestation	7	6	6	9	6	15	11

The analysis of data presented in the Table 2, revealed that the lack of suitable HYVs, lack of technical knowledge and low of irrigation water followed by problems of wild animals were the major constraints of hybrid Napier production. Other constraints such as grass hopper infestation, weed infestation and low soil fertility were also found as came so of low productivity for hybrid Napier production. Among all the constraints, low soil fertility got the least concerns. These finding are in the agreement of the results as reported by earlier workers (Ouma *et al.* 2002, Joshi *et al.* 2005) in maize production.

Performance of FLD

A comparison of productivity levels between demonstrated variety and local checks is shown in Table 3.

Table 2 Frequency distribution of RBQ values given by farmers (n=75)

Problems	RBQ	Overall rank
Lack of suitable HYVs	85.47	I
Lack of technical knowledge	67.85	II
Low soil fertility	47.61	VII
Lack of irrigation water	66.19	III
Problems of wild animals	62.85	IV
Grasshopper infestation	57.14	V
Weed infestation	50	VI

During the period under study, it was observed that in front line demonstrations, the improved hybrid Napier variety APBN 1 recorded the higher green fodder yield (970 q/h) in seven cuttings with compared to local check (665 q/h). The percentage increase in the yield over local check was 45.86. More or less yield enhancement in different crops in front line demonstration has amply been documented by Hiremath *et al*. (2007), Mishra *et al*. (2009), Kumar *et al*. (2010) and Dhaka (2010). From these results it is evident that the performance of improved variety was found better than the local check under local conditions. Farmers were motivated by results of agro technologies applied in the FLDs trials and it is expected that they would adopt these technologies in the coming years. Yield of the frontline demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index. The technology gap shows the gap in the demonstration yield over potential yield and it was 230 q/h. The observed technology gap may be attributed to dissimilarities in soil fertility, salinity and erratic rainfall and other vagaries of weather conditions in the area. Hence, to narrow down the gap between the yields of different varieties, location specific recommendation appears to be necessary. Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index more is the feasibility. Result of study depiction in Table 3 revealed that the technology index values were 19.16. The results of the present study are in consonance with the findings of Sawardekar *et al*. (2003), and Hiremath and Nagaraju (2009).

The economics of hybrid Napier (green fodder) production under front line demonstrations were estimated and the results have been presented in Table 4. Economic analysis of the yield performance revealed that front line demonstrations recorded higher gross returns (₹ 67 900/ha) and net return (₹ 40 500/ha) with higher benefit ratio (2.48) as compared to local checks. These results are in accordance with the findings of Hiremath *et al*. (2007) and Hiremath and Nagaraju (2009). Further, additional cost of ₹ 4 600/ha in demonstration has increased additional net returns ₹ 16 800/ha with incremental benefit cost ratio 4.65 suggesting its higher profitability and economic viability of the demonstration. Similar results were also reported by Hiremath and Nagaraju (2009) and Dhaka *et al.* (2010).

Table 3 Yield, technology gap and technology index of demonstration

Variables	Yield (q/h)	Increase (%) over local check	Technology gap (q/h)	Technology index (%)
Local check	665			
Demonstration (APBN 1)	970	45.86	230	19.16

Table 4 Economics of frontline demonstrations

Variables	Cost of cultivation (₹/ha)	Gross return (₹/ha)	Net return (₹/ha)	Benefit cost ratio
Local check	22 800	46 500	23 700	2.03
Demonstration	27 400	67 900	40 500	2.48
Additional in demonstration	4 600	21 400	16 800	4.65*

* Incremental benefit cost ratio

Increase in knowledge

Knowledge level of respondent farmers on various aspects of improved hybrid Napier production technologies before conducting the frontline demonstration and after implementation was measured and compared by applying students't' test.

It could be seen from the Table 5 that farmers mean knowledge score had increased significantly by 32.42 after implementation of frontline demonstrations, as the computed value of't' (6.01) was statistically significant at 5% probability level. The results are in consonance with that of Narayanaswamy and Eshwarappa (1998), and Singh *et al.* (2007). It means there was significant increase in knowledge level of the farmers due to frontline demonstration. This shows positive impact of frontline demonstration on knowledge of the farmers that have resulted in higher adoption of improved farm practices.

Farmers' satisfaction

The extent of satisfaction level of respondent farmers over extension services and performance of demonstrated variety was measured by Client Satisfaction Index (CSI) and results presented in Table 6.

Results of study revealed that the majority of the

Table 5 Comparison between knowledge levels of the respondent farmers about improved farming practices of hybrid Napier (n=60)

Mean score			Calculated 't' value
Before FLD implementation	After FLD implementation	Mean difference	
34.32	66.72	32.42	6.01*

* Significant at 5% probability level.

Table 6 Extent of farmers satisfaction of extension services rendered (n=60)

Satisfaction	Level Number	Per cent
Low	8	13.33
Medium	34	56.67
High	18	30.00

respondent farmers expressed medium (56.67%) to the high (30.00%) level of satisfaction for extension services and performance of technology under demonstrations. Whereas, very few (13.33%) per cent of respondents expressed lower level of satisfaction. The results are in conformity with those reported by Narayanaswamy and Eshwarappa (1998) and Kumaran and Vijayaragavan (2005). The medium to higher level of satisfaction with respect to services rendered, linkage with farmers, and technologies demonstrated, etc. indicate stronger conviction, physical and mental involvement in the frontline demonstration which in turn would lead to higher adoption. This shows the relevance of frontline demonstration.

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