



Participatory Approach in Adoption of Fodder Cultivation Technology towards Increase in Milk Production in Garhwa District of Jharkhand

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Abstract

The study was conducted on 40 small and marginal dairy farmers in Garhwa district of Jharkhand. The animals were maintained only on paddy straw and agricultural residues after onset of rainy season. In previous year little work has been done on demonstration and cultivation of green fodder for enhancement of milk production in this area. Training and Front Line Demonstration (FLD) of green fodders were conducted in selected dairy farmers by Krishi Vigyan Kendra (KVK) in the district. The results depicted that there were significant ($P < 0.05$) increased in the milk production after feeding of seasonal green fodder throughout the year. FEAST computer program was used to analyse feed resources of the area and it was found that the small holder dairy production system entirely depend upon paddy straw along with supplementation of concentrates. The economic analysis of the dairy farmers revealed that annual net income can be increased 2.45 to 3.70 times by reducing 30 to 40% feeding cost after the availability of green fodders round the year as an alternative of commercially available feeds. It is highly recommended that to organize more and more demonstrations on this technology to make the dairy farming sustainable in this fragile ecosystem. Training, demonstration and awareness programme on large-scale, adoption of fodder production technology among the farmers is an urgent need of the hours to increase milk production as well as farmer's income.

Keywords: *Adoption, Fodder Technology, FEAST, Dairy Farmers, Jharkhand*

Introduction

Technological progress is a means of 'transforming society and its value systems' (Juma and Yee-Cheong, 2005). There is a general consensus that the application of new technologies and practices is largely based on the desire of farmers to maximize economic returns. Increased income depends on higher degree of adoption (Seth. *et al.*, 2016). The extent of adoption of dairy technology is higher (Singh. *et al.*, 2014) with less constraint (Singh. *et al.*, 2015).

Dairying in India is an important livelihood support activity, as over 80% of milk in India is produced by smallholders. Milk production

in Garhwa district of Jharkhand is also dominated by small and marginal farmers. Acidic soil, rainfed farming, poor resources, huge barren scattered land and erratic climate hinders growth of dairy farming in Garhwa district. Green fodder provides natural way of nutrients for animals and plays major role in animal growth, production and reproduction. Feeding is the foundation of livestock system on accounts for more than 70% of the total cost of milk production (Hossain. *et al.*, 2017).

The promotion of green fodder cultivation round the year at the farmer's field covering cereal fodders like maize, jowar etc, legume

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fodders such as cowpea, berseem, lucerne etc, grass fodder like hybrid napier and aquatic fern azolla throughout the year may play effective role in dairy production of Garhwa. The growth in milk production is dependent upon health of dairy cattle which is a product of many sub constituents including the feeding practices and the availability of right kind of feed and fodder in the locality. Therefore, present study was undertaken with the objective to increase towards milk production through intervention of improved green fodder cultivation technology in the study area.

Materials and Methodology

The study was conducted in Garhwa (24.1085° N and 83.6774° E) district of Jharkhand. The latitude and longitude depicted that district has highest concentration of dairy farmers and purposely targeted farmers who were engaged in dairy farming for a minimum period of 5 years so as to have proper and reliable response on different variables. The study employed purposive sampling technique to select the ultimate sampling units, thus, making a sample size of 40 farmers participated in Front Line Demonstration (FLD) Programme of Krishi Vigyan Kendra, Garhwa. The front line

demonstration was conducted on fodder cultivation technology in which Maize (var. African Tall), Jowar (var. Pusachari-23), Berseem (var. Vardan), Cowpea (var.UPC-5286), Lucerne (var. Anand-2), Hybrid Napier (var. Kamdhenu) and Azolla (sp. *A. pinnata*) were demonstrated in farmers’ field to meet out round the year green fodder supplementation. The training programme on importance of feeding green fodder and improved fodder cultivation technique for dairy production was organized by KVK, Garhwa for the selected dairy farmers under FLD and critical inputs like fodder seeds and sapling cuttings were provided to the farmers for sowing of the crops in time. Data were recorded for quantity of milk production before and after intervention of FLD. The SPSS v25 statistical tool was use to analyzed the recorded data on milk production. Feed and fodder situation in Garhwa region was analyzed with help of *FEAST* computer program developed by International Livestock Research Institute (ILRI). Dairy cows of selected farmers were also clinically tested by experts to assess the overall health condition of the animals after adoption of the technology.

Table 1: Type of fodders selected for Front Line Demonstration

Type of fodder	Kharif (March - Aug)	Rabi (Oct -March)
Seasonal	Maize(var. African Tall) Jowar (var. Pusachari-23)	Barseem (var. Vardan) Cowpea (var. UPC-5286) Lucerne (var. Anand-2)
Perennial	Hybrid Napier (Var. Kamdhenu) Azolla	(sp. <i>A.pinnata</i>)



Fig 1: Hybrid napier cultivation



Fig 2: Training and Demonstration of Azolla cultivation



Fig 3: Feeding of paddy straw only



Fig 4: Milk production

Result and Discussion

The Feed Assessment Tool (FEAST), developed by International Livestock Research Institute (ILRI), is a systematic method to assess local feed resource availability and use pattern (Duncan. *et al.*, 2012). Feed and fodder situation in Garhwa region was analyzed with help of FEAST computer program (Das. *et al.*, 2017). Table 1 showed that front line demonstration on seasonal fodders viz ; maize (var. African Tall) and jowar (var. Pusachari-23) in kharif season, barseem (var. Vardan), cowpea (var. UPC-5286) and lucern (var. Anand-2) in rabi season and Hybrid napier (var. Kamdhenu) and Azolla (sp. *A. pinnata*) as perennial fodders have been selected for the technology demonstration.

Table 2: Production and feeding schedule of green fodders

Green fodders	Area (acre)	Production (q/acre)	Feeding of green fodders (kg/cow/day)
Maize	0.5 - 1.0	150	2.0
Jowar	0.7 - 1.0	10	1.5
Hybrid napier	0.8 -1.5	1500	1.5
Berseem	1.5 - 2.0	760	2.5
Cowpea	1.0 -2.0	100	1.5
Lucerne	0.5 -1.5	300	1.5
Azolla	0.5 -1.0	1000	1.0

Milk quantity was recorded before and after intervention to evaluate the effect of green fodder on milk production. Milk production was significantly ($P < 0.05$) increased (Fig.5) during onset of rainy season after feeding of

green fodder throughout the year. It was found substantially increased in rabi season (Fig.5). This fact might be attributed to feeding of leguminous fodders like barseem and cowpea in this period.

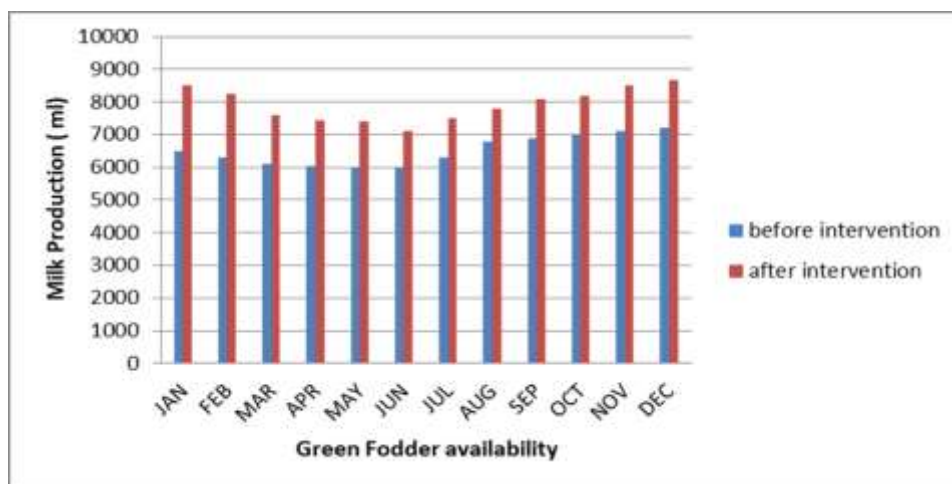


Fig 5: Milk production before and after intervention of green fodder

For dairy farming, owning a land is an important factor for sustainability of the farming. Various surveys in Asia and Africa indicated that larger the farm land/ household more was the milk production (Skunmun. *et al.*, 2000; Mubiru. *et al.*, 2007). The data (Table 3) showed 55 per cent of dairy owners have land holding up to 0.5 acre, followed by more than 0.5 acre (25 %) and only residence compound (20 %). This fragmented and smaller land profile was typical to the area and demonstrated vulnerable situation of the small holder dairy farming of the region. It was reported that only 6.84% dairy farmers produced green fodders in study area and paddy straw remains as the principal crop residues used as dry fodder. Previous study revealed that feeding of green fodder based ration significantly ($P < 0.05$) increased the milk production in buffaloes (Hossain. *et al.*, 2017). It was also found that income of farmers were two folds higher when green fodder was fed to the animals during monsoon and winter season (Khan. *et al.*, 2009). Similarly, it was also stated that the feed cost per kg milk produced was lowest for the cows fed 70% forage, followed by the cows fed 50% forage and the cows fed 30% forage (Sanh. *et al.*, 2002). Cattle rearing has always remained as a status symbol for tribals and non-tribals of Jharkhand. Data pertaining to herd size possessed by the dairy farmers are presented in Table 3. The enumeration of total herd strength (Table 3) indicates that the majority of farmers (78%) possessed medium herd size (up to 4-6 milch animals) whereas, 14 percent farmers had small herd size (up to 3 milch animals)

and 08 percent farmers had large herd size (more than 6 milch animals). Table 3 also depicted that most of the educated (72.5 %) and majority of young farmers (50 %) belongs to age group 30 - 40 were involved in dairying and quickly adopted this technology to become an entrepreneur in this lucrative field. It has been also found that 55 % of the families (size 6 to 8) were adopted dairying with fodder production as a source of income followed by 25% and 20 % of the family sizes up to 12 and less than 5 respectively. Table 3 also revealed that majority of farmers (47.5 %) has annual income up-to Rs. 1, 20,000 and 17.5 per cent farmers have noted that annual income more than Rs. 1, 50,000. According to Jharkhand Economic Survey (2020-21) showed that the annual income of respondent farmers has higher per capita annual income than other farmers in the study area. There is need of adoption of fodder cultivation technology to reduce feeding cost and to enhance their annual gross income in Jharkhand. As green fodders are the comparatively cheaper source of essential nutrients, their inclusion in diet significantly reduced cost of feeding in terms of rupees per day, subsequently reduced the cost of milk production and generates higher net daily income. Economics of the demonstration was analyzed (Table 4) and it was observed that gross income from dairy cows was Rs. 1,51,200 annually before intervention whereas it was increase to 1,94,400 after feeding of green fodder throughout the year. The B: C ratio was also increased from 2.21 to 3.11 after adoption of green fodder cultivation technology.

Table 3: Socio - economic attributes of dairy farmers of Garhwa district (n=40)

Variable	Category	Frequency	Percentage (%)
Age	30 - 40	20	50
	41 - 50	14	35
	More than 50	06	15
Education	Non- metric	04	10
	Metric pass	07	17.5
	Graduate	29	72.5
Family Size	Less than 5	08	20
	6- 8	22	55
	Up to 12	10	25
	Up to 0.5 acre	22	55

Land holding	More than 0.5 acre	10	25
	Only Home-stead land	08	20
Herd size	Small- Up to 3 animals	06	14
	Medium- 4-6 animals	31	78
	Large- more than 6 animals	03	08
Annual income	< Rs. 120000.00	19	47.5
	Rs. 120000 - 150000.00	14	35
	>Rs. 150000.00	07	17.5

Note: Jharkhand Economic Survey (2020-21)

Table 4: Impacts of fodder production technology adoption on milk production

Impact factor	Before adoption	After adoption
Technology intervention	Feeding of paddy straw + concentrate feeds + pashu-ahaar	Feeding of green fodders throughout the year + paddy straw + concentrate feed 50% + pashu-ahaar
Av. milk production (Litre/month/cow)	280	360
Recurring cost (Rs/month/cow)	5,700	5,200
Gross income (Rs/month/cow)	12,600	16,200
Net profit (Rs /month/cow)	6,900	11,000
Recurring cost (Rs/year/cow)	68,400	62,400
Gross income (Rs/year/cow)	1,51,200	1,94,400
Net profit (Rs /year/cow)	82,800	1,32,000
B: C Ratio	2.21	3.11

Conclusion

The study concluded that supplementation of feed with green fodders has increased the quality and quantity of milk production and the economic analysis revealed that annual net income can be increased substantially by reducing 30-40% feeding cost. Thus, the locally availability of green fodders round the year could be used as alternative of commercially available feeds. This approach might be made effective technology option to sustainable dairy production for the small holder dairy farmers in the district and Jharkhand state.

Recommendation

It is recommended that seasonal green fodders should be given daily to milch cows throughout the year along with dry fodders and concentrate feeds so that animals can obtain good health condition and persist longer period and ultimately it increases milk

production. Training, demonstration and awareness programme on large-scale, adoption of fodder production technology among the farmers is an urgent need to increase milk production as well as farmer's income.

Impact

After conduction of the study, 18 farmers were adopted this technology and expanded their dairy farm as commercial dairy farm. The milk production in Garhwa district was also increased and four Bulk Milk Chilling Centers were established in this area namely: Marhwanian BMC, Majhion BMC, Kanchanpur BMC and Latdag BMC.

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