Int.J.Curr.Microbiol.App.Sci (2018) Special Issue-7: 2760-2766

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Special Issue-7 pp. 2760-2766**
Journal homepage: http://www.ijcmas.com

Original Research Article

Success Story of Magahi Paan Grower for Income Enhancement in Rural Area

Shivnath Das*, Prabhat Kumar, A.K. Pandey, A.K. Das and Sangeeta Kumari

Betelvine Research Centre, Islampur, Nalanda-801303 India
(Bihar Agricultural University, Sabour, Bhagalpur), India
**Corresponding author*

A B S T R A C T

Magahi Paan (*Piper betle* L.) is well known over the country and mainly grown in the Magadh region of Bihar so named Magahi paan. The net income is higher than other pan due to its high quality leaf. It acts as source of employment generation for livelihoods security in Bihar. Approximately, 20.8 lakh rural people derive their livelihood directly or indirectly from production, processing, handling, transportation and marketing of betel leaves in Bihar. Sri Ranjeet Chaurasiya who cultivating Magahi paan with adoption of ICM practices and enjoyed happy family life. His every family member was engaged in different operation of betelvine cultivation round the year and get profit at regular interval.

Keywords

Magahi Paan Grower , Success Story, ICM practices and economics

Introduction

Preamble

Magahi Paan (*Piper betle* L.) is most popular Betelvine cultivar of Bihar origin and got position under GI act by Government of India (Anonymous, 2017). It is mainly cultivated by small and marginal farmers in agro-climatic Zone IIIB of Bihar which comprises Aurangabad, Gaya, Nawada and Nalanda districts. Betel vine crop occupied an area about 4000 ha in 23 districts of Bihar out of which 439 ha area (Table 1) covered by Magahi Pan (Jha and Kumar, 2014). Magahi pan growing in these areas are of excellent quality and fetch higher market price than other cultivars of betel leaf. Its betel quid is pungent, less fibrous, and easily soluble inside mouth. The trade of this crop is estimated about Rs. 100 corers annually in the state (Srivastava and Prasad, 1996) and approximately, 20.8 lakh rural people derive their livelihood directly or indirectly from production, processing, handling, transportation and marketing of betel leaves in Bihar (Das *et al*., 2017a). Magahi paan fetched annually net return of Rs. 111945 with benefit cost ratio is 1.47 (Table 2) However, the yield of betel leaves varied in various months of the year. It fetched comparatively higher market price during the months of January to March than July to December months.

Success Story of Magahi Paan grower

Sri Ranjeet Chaurasiya, S/o Late Radhe Chaurasiya was born on 15th February, 1975, at village Debari, block Hisua, Post

Office, Barhona, district Nawada (Pin 805103) of Bihar state. He is a progressive Magahi Pan Grower of his locality and his educational qualification is B.A in Political Science. He has two brothers and 2.0 acres of land in a joint family.

With the help of the local ATMA office and Betelvine Research Centre, Islampur, he has participated in many training programmes, Zonal Research and Extension Advisory Meeting (ZREAC), Research Council Meeting, Extension Council Meeting and different workshops organized by the Bihar Agricultural University, Sabour (Bhagalpur) and BAMETI, Patna.

He grows betelvine crops by using general agronomical practices traditionally. When he was convinced about the profitability of betelvine cultivation with adoption of ICM practices by Betelvine Research Centre, Islampur, he decided to grow this crop by using ICM practices. After a year of cultivation, he could get a good amount of profit. He sale the produce (betel leaves) in the local Mandies of Gaya (Bihar) and Varanasi (Uttar Pradesh). This centre provides technical advice to him for the cultivation of betelvine and processing of betel leaves as and when required

Materials and Methods

Methodology of ICM practices adopted by farmer

The demonstration trial of Integrated Crop Management practices for enhancement of betel leaf production of Magahi Paan was conducted in his field during 2014-15 by Betelvine Research Centre, Islampur, under AICRP on MAP & Betel vine project. The results of farmers practice were compared with the technology of ICM practices in terms marketable leaf of betelvine with the management of *Phytophthora foot rot* disease. Following ICM practices was used for the demonstration (Table 3). The yield data were collected from both the demonstration and farmer's practice and workout to calculate the technology gap; extension gap and the technology index with the help of following formula as reported by (Samui *et al.,* 2000).

Technology gap (Dholi/ha**)**	=	Potential yield - demonstration yield
Extension gap (Dholi/ha**)**	=	Demonstration yield - farmer's yield
Technology index (%)	=	[(Potential yield - demonstration yield) X100]/(Potential yield)

General agronomical practices followed for betevine cultivation

Planting material	Used vine cutting having three nodes from the mother plant (more than two years old plant) along with attached leaves
Time of planting:	April to July (Best time of planting April-May)
Selection of Site:	upland areas where soil leveled with a gradual slope is maintained for drainage of excess water
Land Preparation	Deep ploughing and formation of ridge and furrow system
Bareja Construction (Conservatory)	Using bamboo (Full Bans), locally available material like paddy straw and arhar stick for construction of bareja.
Plant population	1.5 lakh vine/ha
Spacing	30 x 15 cm
Planting Method	Dibbling method of panting is general practice which is done

	with the help of khurpi on ridge of 50 cm width on both side of border in such a way that two internodes of vine placed inside the soil and one internodes above the soil surface with minimum one leaf
Nutrient management	Application of 200: 100: 100 NPK/ha/year. Generally, half of the nutrient requirement is supplied through organic source and rest is supplied through inorganic fertilizer. Zinc sulphate @ 25-30 Kg/ha in zinc deficient soil once in three years are also advocated to apply.
Irrigation	Frequent light irrigation is done through delivery pipe. During the summer season, irrigation is given almost every day in the new plant and weekly in the old plant. During winter season, irrigation is reduced to a fortnight interval.
Intercultural operation	During the month of July and November, lowering of vines is done simultaneously with earthingup operation. The main aim of this practice is to boostup rejuvenation of new plants from the vines lying on the soil surface.
Staking of vine	Staking of vine on sarkanda (Ekeri) is done with the help of Kans
Weed management	Generally manually weeding
Plant protection measures	sanitation of bareja after onset of Monsoon + Drenching with Bordeaux mixture (1%) + soil application of bioagent (Formulation of *Trichoderma viride* inoculated in the 500 kg mustard oilcake/ha (@ 1.0 kg Trichoderma /100kg mustard cake after 30 days of drenching +one more drenching with Bordeaux mixture after 60 days of first drenching + use of neem based formulation for management of insect-pest as and when required
Harvesting	By twisting peduncle of leaves, mature leaf age -3 month
Yield / ha	On an average 60-70 lakh marketable leaves are harvested annually from one hectare of land.
Grading	Grading of bête leaf done on the basis of size and maturity of leaves
Marketing	Paan is generally sold in term of ‘Dholi’ (1 Dholi = 200 betel leaves). Gaya (Bihar) and Varanasi (Uttar Pradesh) are major market of Magahi Paan where trading is done every day.

Technology gap (Dholi/ha**)** = Potential yield - demonstration yield

Extension gap (Dholi/ha**)** = Demonstration yield - farmer’s yield

Technology index (%) = [(Potential yield - demonstration yield) X100]/(Potential yield)

Results and Discussion

Effect of ICM practices on betelvine production

The comparative study of crop performance under ICM and farmers practice from the field of Sri Ranjeet Chaurasiya (Table 4), it was found that the ICM practices resulted maximum marketable leaf yield (22700 Dholi/ha) than farmer's fields (18000 Dholi/ha)

The crop under ICM practices have low incidence of foot–rot (10.0%) as comparison to farmers practices (30.45%). Similarly ICM practices produces better leaf quality with highest fresh weight of 100 leaves (123.0 g) whereas, lower fresh weight of 100 leaves (117.8 g) was observed under farmer practice. After that, he was adopting ICM practices and can increase their marketable leaves of Magahi Pan with lower incidences of diseases like *Phytophthora foot rot* by adopting ICM practices and gets higher market price. The results are in close conformity with the finding of Das *et al*., 2014 and 2016.

Effect of ICM practices on extension parameters

It is evident from the data presented in Table 4 that the technology gap was 7300 Dholi/ha. The technology gap observed may be attributed to the dissimilarity in the trends adopted by farmers and day by day enhancing diseases incidences as well as changing weather condition. Hence timely application of ICM technology to manage of *Phytophthora foot rot* disease incidence in betelvine resulted into minimize the technology gap for yield level of different situations. The extension gap which was 4700 Dholi/ha emphasized the need to educate the farmers through various means for adoption of Integrated Crop Management module for the management of *Phytophthora foot rot* disease in betelvine. The technology index (24.33 %) showed the feasibility of the ICM technology at the farmer's fields. The lower value of technology index means more feasibility of the technology. As such, reduction of technology index, The variation in yield from location to location can be accounted for varying climatic condition, prevailing microclimate and variation in agricultural practices followed by farmers resulted in more occurance of *Phytophthora foot rot* disease incidence. Similar results on technology gap, extension gap and technology index were also reported by Kumar and Kumar (2017) in okra

Efforts of farmer towards protection of Magahi Pan under G.I. Act

With the help of Betelvine Research Centre, Islampur, Sri Ranjeet Chaurasiya made contribution towards formation of an association entitled "Magahi Paan Utpatak Kalyan Samiti, Bihar" which was registered under registration society act 21/1860 in Govt of Bihar Patna vide its registration number S000611 dated 24/01/2017. He act as secretary of that society and attended two meeting at New Delhi along with scientist of Betelvine Research Centre, Islampur (BAU, Sabour). As per protocol of G.I, he has also submitted supporting documents of Magahi Pan to GI office, head branch, Chennai and finally Govt of India provide tag of GI to Magahi pan (GI application no. 554 dated 20.06.2016) which was Published on 28 November, 2017 in Georaphical Indication journal of India under volume 101 at page no. 69-77

Table.1 Area under Betelvine cultivation in major districts of Bihar

District	Area (ha)	District	Area (ha)
Bhagalpur	150	Vaishali	300
Munger	100	Sitamarhi	150
Begusarai	136	East Champaran	250
Khagaria	140	West Champaran	225
Katihar	100	Darbhanga	250
Purnea	200	Madhubani	275
Madhepura	75	Nawada	90 (Magahi paan)
Saharsa	70	Gaya	74 (Magahi paan)
Saran	100	Aurangabad	150 (Magahi paan)
Samastipur	200	Nalanda	125 (Magahi pan)
Muzaffarpur	90	Others districts	750

Table.2 Economics of Magahi Paan cultivation

Sl.no	Grading of betel leaf according to size and maturity	Yield (Dholi/ha)	Market price (Rs./Dholi)	Amount from sale (Rs.)	Remarks
1.	Garauti paan	144	30.00	4320.00	June- July
2.	Thethi paan	288	25.00	7200.00	June- July
3.	Thari paan	288	80.00	23040.00	Aug-Sept
4.	Herua paan	288	100.00	28800.00	Oct-Dec
5.	Gaat paan	632	300.00	189600.00	Jan-Mar
6.	Barua paan	488	150.00	73200.00	Jan-Mar
7.	Chhutauna paan	200	30.00	6000.00	Jan-Mar
8.	Modwar paan	100	20.00	2000.00	Jan-Mar
9.	Lakar paan	244	50.00	12200.00	April-May
10.	Tapra paan	200	25.00	5000.00	April-May
11.	**Gross monetary Return (GMR)**			**Rs. 351360**	-
12.	**Net monetary return (GMR - Cost of cultivation)**			**Rs. 111945**	-
13.	**B:C Ratio (GMR divided by Cost of cultivation)**			**1.47**	-
*Note: 1 Dholi = 200 betel leaves and cost of cultivation is Rs. 239415					

Table.3 ICM practices for Magahi pan cultivation

Technology followed	Farmers Practices	ICM Practices
Variety	Magahi Pan	Magahi Pan
Seed treatment	Nil	*Trichoderma viridi* @ 5g/liter water
Plant population	1.25Lakh/ha	1.5 Lakh/ha
Fertilizer	Inorganic only	Vermicompost @ 10t /ha
Biofertliser	Nil	Azatobactor @10 kg/ha or Phosphobactor @10 kg/ha
Integrated disease management	Chemical control	Sanitation & soil drenching with 1% Brodeaux mixture at pre-monsoon & 60 DAP + *Trichoderma viridi* @10 kg/ha at 30 DAP
Growth promoter	Mustard cake	Mustard cake

Table.4 Effect of ICM practices on marketable leaf of betelvine (CV- Magahi Paan)

Marketable leaves (Dholi/ha)		**Fresh weight of 100 leaves (g)**		**Incidence of *Phytophthora foot rot* (%)**		**Extension parameters**		
Farmer Practice	ICM Practices	Farmer Practice	ICM Practices	Farmer Practice	ICM Practices	Techno logy gap (Dholi/ha)	Exten sion gap (Dholi/ha)	Techno logy index (%)
18000	22700	117.8	123.0	30.45	10.0	7300	4700	24.33

Problem faced by farmer

The major problems in betel leaf farming were traditional management operations, unskilled labour, pest and disease problem, non existence of regulated market, presence of too many middlemen and price fluctuation (Kaleeswari and Sridhar, 2013). However, Zn-deficient soil also act as limiting factor for sustainable production of betelvine in agro-climatic zone III B of Bihar (Das *et al*., 2017b)

In conclusion, the state government should take appropriate steps towards awareness regarding ICM practices of betelvine among betel growers of Bihar. Besides, It is need to recognise betel leaves of Magahi Paan as an important trading commodity. If farmers have given a little support in terms marketing facility at Patna or Gaya then betel leaf trade will be flourishes to boost up the state economy and generate employment opportunities for the rural people.

Acknowledgement

We acknowledge the Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat and Directorate of of Research, Bihar Agricultural University, Sabour (Bhagalpur) for providing us all resources which were essential for doing these demonstration and completion of objectives.

References

Anonymous. 2017. Application made by Magahi Paan Utpatak Kalyan Samiti, Bihar registered under GI application no. 554 dated 20th June, 2016 in respect of Horticultural crop (Betelvine) falling in class 31 and accepted under sub section 13 of Georaphical Indication of Goods Act, 1999, Government of India. Georaphical Indication journal 101: 69-77

Das Shivnath, Kumar Prabhat and Pandey Ajit Kumar .2017b. Effect of zinc application on marketable leaf production of betelvine, In: Proceeding of National Conference on Climate Change and Agricultural Production. Adapting Crops to Climate Variability and Uncertainty held at BAU, Sabour during April 6-8, 2017. Excel India Publishers, New Delh pp. 220-221

Das Shivnath, Pandey Ajit Kumar and Kumar Prabhat.2017a. Betelvine Cultivation: A New Avenue for Livelihood Security. Hortflora Research Spectrum. 6(4): 300-303

Das Shivnath, Ranjan Rakesh Deo, Azad Chandrashekhar and kumar Amrendra.2014. Integrated crop management for sustainable production of Betelvine in Bihar. *NASA-2014* Compedium-cum

Abstract. International symposium on New-Dimension in Agrometeorology for sustainable Agriculture. GBPUA and Technology, Pantnager, India during 16-18 October, 2014. Pp 353

Das S.N, Kumar P, Pandey AK and Ranjan RD. 2016. " Enhancement of betelvine production through integrated crop management practices". Extended Summaries Vol. 2 : 4th International Agronomy Congress, Nov. 22–26, 2016, New Delhi, India

Jha P.K and Kumar N. 2014. Status of betelvine crop in Bihar, pp. 102-105. In: Hima B.K., Suravanaravana M.A and Vasantha K.T (eds.) Compadium, National Meet on Betelvine-Farmers, Traders and Researchers interface, 22-23, February, 2014, IIHR, Bengaluru.

Kaleeswari V and Sridhatr TS. 2013. A study on betelvne cultivation and market crisis in Kaur district, Asian Journal of Applied Research, 3(10):1-3

Kumar Upesh and Kumar Suresh. 2017. IDM module for management of yellow vein mosaic disease in okra Hortflora Research Spectrum. 6(3): 215-217

Samui S.K., Maitra S., Roy D.K., Mondal A.K. and Saha D. 2000. Evaluation of front line demonstration on groundnut (*Arachis hypogeal* L.). J. Indian Soc. Coastal Agric. Res., 18**:** 180-183

Srivastava C and Prasad B.1996. An Economic Analysis of Marketing of Betel Vine in Bihar. The Bihar Journal of Agricultural Marketing, 4(2):157-165.