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Existing marketing system and economic analysis of Broom grass (*Thysanolaena maxima* Roxb: Poaceae)

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Abstract: A comprehensive field survey was made throughout Chittagong, Cox's Bazar, Bandarban, Rangamati and Khagrachari hill districts during 2007-2010 to study the species diversity, processing, existing marketing system, export potentialities, economic implication of article processed from broom grass (*Thysanolaena maxima* Roxb: Poaceae). Another field experiment was also conducted to know the Benefit-Cost (B/C), IRR ratio for economic analysis of this species. Seven different types of broom grass were identified in the study areas. The local name of these broom grass were Moishaphool, Jathiphool, Shadajathiphool, Khairijathiphool, Lalchejathiphool, Harinaphool and Biniphool. Those broom grass had 4 different panicle colors i.e. black, red, green and golden. Among them Jathiphool, Harinaphool and Biniphool were found exportable. After harvesting these were dried, binded and then transported to different places for selling through a certain channel. Geometric increase of price of broom grass in each selling stage was also observed. From harvesters to wholesale market it become double, after processing it increased 10^{th} times, and in rural and urban area it increased around 15^{th} and 18^{th} times, respectively. The price increased 20^{th} times from the harvesters' price when these were exported. The revenue collection from broom grass in Rangamati hill tracts was Tk 406300.00 in the year 2006-2007. January to July was found broom grass released period in the year, where February was the pick-period and highest revenue (Tk 274600.00) was earned in the month of February. The field experiment findings revealed that B/C ratio at 10, 15 and 20% AIR was 1.61, 1.54 and 1.48, respectively and IRR 69% at 0.50 ha experimental plantation of *T. maxima*.

Key words: Broom grass, marketing chain, domestication, export and economic potentialities

Introduction

Brooms grass (*Thysanolaena maxima* Roxb: Poaceae) a tall, tufted, reed like perennial grass. It is one of the most important non-timber forest resources in the lands of Chittagong and Chittagong Hill Tracts. Its inflorescence is made into broom which is locally known as *Phool jhadu*. Its English name is broom grass/bouquet grass/tiger grass. It is belongs to the family Poaceae. Generally, it grows in temperate and sub-tropical parts of India, Bhutan, Myanmar, China, East Asia, Nepal, New Guinea and Malaysia up to 2000 m (Watson and Dallwitz, 1992). It flowers during June-July and bear inflorescence (panicle) on the shoot apex at the end of vegetative growth. It grows naturally in the hilly lands of Chittagong hill districts and Chittagong as undergrowth. Among all the non–timber forest produces, it is one of the most important underutilized plant and value added product. It is mostly used for cleaning floors, lime washing of building wall, leaves and tender culms for forage, woody culms for fuel, mulch material and support stakes in crop fields for trailing crops. The leaves of broom grass have a balanced proportion of nutrients showed a positive balance for calcium, phosphorous and nitrogen (Palni *et al.*, 1999). The decoction of its roots is used as a mouth-wash during fever and paste of dried of fresh roots applied on the skin to check the boils (Rai and Sharma, 1994). The fibrous root-mat effectively protects the top soil and nutrients from erosion slopping terrain, landslides affected areas and agricultural fields. Water run-off and soil loss reduced by up to 88% as compared to bare local (Bhucher, 2002). It grows in a wide range of habits with soil P^H ranging from 5.3-9.3, moisture from 11.6-37.6%, organic carbon from 0.4-2.7% and nitrogen from 0.007-0.31% (Palni *et al.*, 1999; Bhuchar, 2002).

It is a most important non-timber forest produces in our country collected by the tribal peoples in the hilly areas of Bangladesh and an important source of income during November – March. But now the forest wealth is depleting gradually. It is being traded and high potential value in home and abroad and exported to Middle East, Pakistan as a non-traditional primary product. But yet not, there is any information on marketing, economic potentialities, management system, cultivation and domestication is available. This paper deals with the existing marketing chain, channels, export potentialities, cost benefit analysis of 0.50 ha experimental plantation of *T. maxima*.

Materials and Methods

The study was carried out in Chittagong, Cox's Bazar, Bandarban, Rangamati and Khagrachari hill districts during 2007-2010. Among these hill districts, market survey was done through observation and discussion with local ethnic peoples, planters, traders, vendors, manufacturers, factory owners, stockiest, exporters, commission agents, cottage based specially at Mogaltoli, Chittagong and export industry, broom grass market (*Phool jaru market*), temporary seller of *boishaki mela*, and collect information on export scenario of broom grass in Bangladesh Export Promotion Bureau (BEPB), Chittagong.

A total 25 processing place (4 commission agent, 8 local traders, 2 suppliers, 8 stockiest, and 3 exporters at Chittagong, Bandarban, Rangamati and Khagrachari Hill Tracts), 14 finished product market, 20 trading shops/ Factory and 10 stockiest/go-down place were visited for collecting comparative market prices of finished product, yearly transaction, average trading money etc.

The collected information and data were tabulated and interpreted in functional ways. A field experiment was also conducted in an area of 0.5 ha to know the Benefit-Cost (B/C), IRR ratio for economic analysis of this species.

Results and Discussion

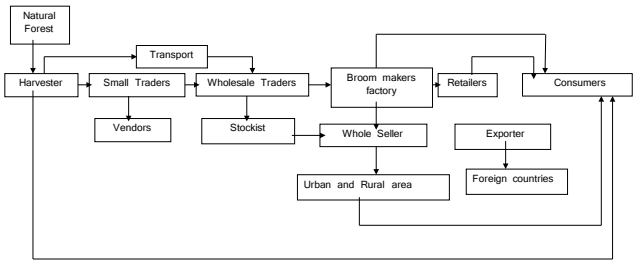
Types of Broom Grass and their distribution: The research findings revealed that there were 4 different panicle colored broom grasses available in the study area i.e. black panicle, green panicle, red panicle and golden

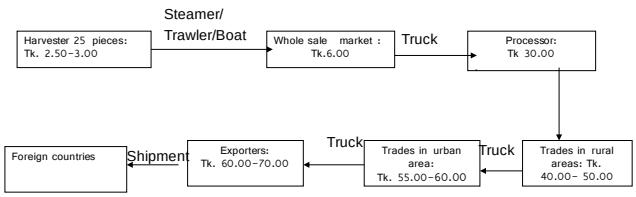
panicle (Table 1). Among the different local types of broom grass Moishaphool had black colored panicle. The culm length of this local type broom grass was highest (240-300 cm), and girth was lowest. Panicle size was 70-90 cm. It was naturally distributed to Rangamati, Kaptai, Khagrachari and Bandarban. It required direct sunlight. The green colored panicle was found in Jathiphool, Shadajathiphool, Khairijathiphool and lalchejathiphool local type of broom grass. Among them Jathiphool was remarked exportable. Culm length and panicle length of all these green panicled broom grasses was found 115- 150 cm and 60-75 cm, respectively. Red colored panicle was found in the Harinaphool local type broom grass. Its panicle length was found highest among all the broom grass but culm length was between 160 -180 cm. Biniphool local type of broom grass had golden colored panicle. Its culm length and panicle length was 180-210 cm and 80-90cm, respectively. Both the red and golden colored panicle was exportable and their harvesting time was January- February.

Table 1. Compare and contrast among different local types of broom grass naturally grown in Chittagong Hill Tracts

SL. No.	Name of local types of broom grass	Size of culms in length (cm)	Girth (cm)	Color and size of panicle (cm)	Harvesting time	Soil depth (cm)	Natural distribution in CHT's	Remarks
1.	Moishaphool	240-300	3-5	Black, panicle 70-90	Sept.-Oct.	30-40	R, K, Kh,Ban.	Direct sunlight
		210-240	4-5	Red, panicle 75-90	Aug-Sept.	40-45	R, K, Kh,	Under shade
2.	Jathiphool	120-150	5-6	Green, panicle short 60-70	15Jan-15Feb	90-100	Nai, Kap.	Exportable
	hadajathiphool	115-125	4-5	Green, panicle 60-75	Jan-Feb.	80-90	Kap, R,Kh.	-
	Khairijathiphool	120-130	5-6	Green, panicle 65-70	Feb-Mar.	90-100	Kap, R, Kh	-
	lalchejathiphool	120-130	6-7	Green, panicle 68-70	Feb-Mar.	90-120	Nai, K, R.	-
3.	Harinaphool	160-180	6-5	Red, panicle 80-95	Jan-Feb.	80-85	K,R,	Exportable
4.	Biniphool	180-210	5-6	Golden, panicle 80-90	Jan-Feb.	50-60	Bans, Nai,	Exportable

Marketing Channel and price fluctuation: In processing field the harvested broom grass were dried 25-30 days in full sun. After completion of full dried they carried this product supplied to broom maker's factory for proper binding. After binding the traders supplied the finished product to Chittagong, Dhaka, Gazipur, Munshigonj, Keranigonj, Khulna, and other districts and different types of seasonal *baishaki mela.* Though there was no proper marketing channel developed in this product. But there were an informal market channel developed harvesting, processing and marketing of broom grass. So there observed a fluctuation of price. Different steps of the market channels and price fluctuation are given in the flow chart 1 and flow chart 2, respectively.





Revenue earned by forest department from broom bundle and its releasing status: Revenue collection was conducted by Forest Department as *Imperata cylindrica*- 'Ulophool' instead of broom grass. The system of revenue collection was generated as transport pass (TP) coming from remote hilly areas of CHT's. Five to eight culms/stick of broom grass bundle sells at Tk. 0.05 (Five paisa) in different station of Rangamati Hill Tracts. According to an observation and collected information, it was found that in Rhaikhyong Mukh, Forest Tax and Inspection Centre, Kaptai earned revenue Tk.20, 315.00 in one season (2006-2007) against released of 406300 number of broom bundles (Fig. 1). The releasing pattern of broom bundle from hilly areas is not uniform round the year. Most of the broom bundle comes out from hilly areas from January to July. Among this duration, February to march is the peak period. Fig. 1 showing the releasing pattern of broom bundles of 2007, when absolutely peak period was February.

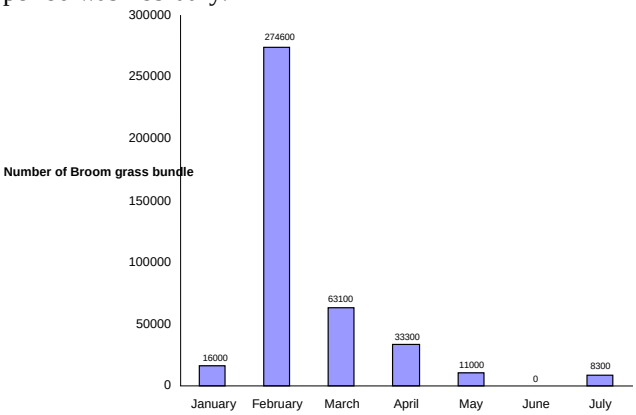


Fig. 1. Monthlies broom grass bundle released in 2007

Broom grass trading: Small cottage industries based on broom grass were developed in greater Chittagong. Among them top ten cottage industries were analyzed. Their total transaction was taka 53.25 lakh. Majority of the transaction was from M/s Kabir Ahmed Sowdagar cottage industry. Whose amount was taka 30.00 lakh. The transaction data on top ten cottage industries are given in Table 2.

Another large number of broom grass trading market in *boishaki mela* locally called *Zabberer bali khela* in Chittagong. In this event, huge amount of broom grass traded. After visited fifty temporary broom grass shop, it was come to know that every shop kept an average Tk.60, 000.00 finished broom grasses. As broom grass traders opinion 50 x Tk.60, 000.00= Tk.30.00 million traded in those days (1 $ = Tk. 80.00).

Table 2. Yearly transaction of top ten broom grass cottage industries developed in greater Chittagong.

Sl no	Factory owner's with address	Yearly transaction (Taka in lakh)	Supplied area
1	M/s Barisal Kutir Shilpa, Prop. Md Shamsu Mia Baniarchara Bazar, Chakoria upazilla, Cox'sBazar	2.00	Nazirphool, Mogaltolli, Chittagong, Koira, Boira, Kalishpur Khulna.
2	M/s. Abu Saleh Mia, Rasulpur, Naikhyongchari upazilla, Bandarban Hill Tracts	2.50	Zinzira, Keranigonj, Mirpur Dhaka and Gazipur
3	M/s Abdur Razzak, Rasulpur, Naikhyongchari upazilla sadar, Bandarban Hill Tracts	1.75	Chittagong
4	M/s. Rahmat Ali, Chakdalabazar, Naikhyongchari upazilla sadar, Bandarban Hill Tracts	2.00	Dhaka
5	M/s. Mostafizur Rahman, Bus stand, Khagrachari sadar, Khagrachar Hill Tracts	2.00	Gazipur, Chittagong
6	M/s. Momong Marma, Faithong Bazar, Lama, Bandarban Hill Tracts	1.00	Boishaki *mela* and *zabberer bolikela*
7	M/s. Kanu Ronjon Das, Mogbazar, Bandarban Sadar, Bandarban Till Tracts	3.00	Locally trade
8	M/s. Kabir Ahmed Sowdagar, Kalipur, Banskhali, Chittagong.	30.00	Chittagong, Khulna, Dhaka and Boishaki mela.
9	Mr.Abu Saed Molla, Jharugolli, Patantulli, Mogoltolli, Chittagong	8.00	Locally trade
10	Mr.Mirendra Marma, Shualock, Majerpara, Bandarban Hill Tracts.	1.00	Bandarbans urban area
	Total:	**53.25**	

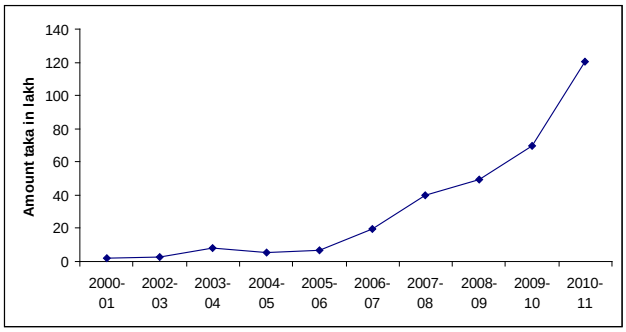


Fig. 2. Export scenario of broom grass stick during 2000-2011

Export scenario: According to the report of Export Promotion Bureau (EPB), annual transaction of brooms grass is around Taka 31.0 lakh (1$= 80.00 Taka) (Fig. 2). It is exported under other primary products in the trade name of "*Broom grass and broom sticks*" before 20-25 years ago and mostly exported to Pakistan, Middle East, Japan, and USA through shipment (Fig. 2.)

Economic potentialities: In the market, every article fetches different prices and depends on the total requirements of broom grass and labour per day for making articles. The economics of making the products in this study has been identified and came to know that different types of 7 articles namely- soft broom for sweeping , brush for white washing, dried culms for fencing/wall door for house, dried material for fueling (leaves, stick, panicle), green leaves, culms for fodder, pole and shade for agricultural crop field (seed bed), door-mat from wastage material were produced from broom grass in terms of net average profit accrued on one man-day (8 hours /day by an adult) and varies its making and market prices from locality to locality. One man can make soft brooms 90 nos. per day, its making cost Tk.18 selling price Tk.30, net profit Tk.121 per brooms and total net average profit Tk.1080. According to factory owners it is known that minimum 4-5 brooms required per house per year for sweeping purposes. Brush for white washing, one can produce 70 nos. of brooms, making cost Tk.15, selling price Tk.25, and net profit per brush Tk.10 and net average profit Tk.700 per day. Dried culms for fueling, one can collect from the nearest forest 2000 nos., collection cost Tk.100, selling price Tk.130 in local market and collect green leaves, culms for fodder 200 nos./3 bundles, collection cost Tk.40, selling price Tk.50, profit Tk.10 and net benefit Tk.30.00 per man a day. One can make dried stick for roofing in rural 2.0 sq.m required 200-250 stick, making cost Tk.50, selling cost Tk.60 and net benefit Tk.40. Pole and shade for agricultural crop field 2 sq.m made require 400-450 sticks in 2 nos., making cost Tk.70, selling cost Tk. 90 and net profit Tk.80 and door-mat were made from wastage materials of brooms in the factory 0.50 sq.m, 10 nos. making cost Tk.30, selling price Tk.70and net profit Tk.400 (Table 3). Since the Broom grass is not available through the year, the entrepreneurs processed and stored the raw materials in different sizes. As a result they engage themselves to produce the articles all year round.

Table 3. Economic potentialities of article processed from broom grass

Name of article processed from broom grass and used	Size in (m)	Number of stick/ bundle/kg	Prodn./ man /day	Making cost/ piece (*Tk.)	Selling price /piece (*Tk.)	Profit/ piece (*Tk.)	Net Av. profit/ Day (*Tk.)
1.Soft broom for sweeping	Broom length: Panicle: 0.7, handle :0.35	25	90	18.00	30.00	12.00	1080.00
2.Brush for white washing	Brush:handle 0.2 brush-0.3	35	70	15.00	25.00	10.00	700.00
3.Dried culms for fencing/wall door for house	4mx2m (8.0sq.m.)	450-500	4	50.00	90.00	40.00	160.00
4.Dried material for fueling (leaves, stick, panicle)	_	2000	2	100.00	130.00	30.00	60.00
5.Green leaves, culms for fodder	_	200	3	40.00	50.00	10.00	30.00
6.Dried stick for roofing	2mx1m (2.0 sq.m).	200-225	4	50.00	60.00	10.00	40.00
6.Pole and shade for agricultural crop field(seed bed)	2m.x1m (2.0sq.m).	400-450	4	70.00	90.00	20.00	80.00
7. Door-mat from wastage material	1m.x0.5m (0.50 sq.m).	0.5	10	30.00	70.00	40.00	400.00

Note: Production cost indicates the cost of harvesting, processing, manufacturing, storing, transportation, risk etc. Selling price indicates retailed market price. *Currency of Bangladesh: Tk. 80 =1US$

Cost and return analysis: Estimate for cost cultivation, yield and economic returns of cultivation were found on the basis of 0.50 ha experimental plantation raised at Keochia Silvicultural Research Station, BFRI, Chittagong. Fourth year production cost (rhizome cutting collection, nursery & site development, pit digging and rhizome planting (324 no), fencing the experimental plot (bamboo post), weeding & mulching (2 times/year), harvesting & drying (once/year) were calculated Tk.3602, Tk.1147, Tk.1955, Tk. 2886 and local market/value Tk. 0.78, Tk.3068, Tk.5858, Tk.7819 were find out and net return were found (-)Tk.3524, Tk. 1921, Tk.3903, Tk.4933

(Table 4 and Fig 3). Maximum cost involved in 1st year and subsequently reducing in next year and get maximum benefit in 4th year. As a result in fourth year, total cost was spent Tk.9590 but total income was found Tk.16823. This information provided general idea about the economics of cultivation and can be helpful to the farmers and others growers who intend to take up its plantation as a cash crop. However, it varies according to labour efficiency, wages, soil fertility, cultural practices, market price and demand etc.

Table 4. Cost and Returns (Tk.) analysis for broom grass (on 0.50 Hectare experimental plantation basis Tk. '000)

Item	Year				Total
	1st	2nd	3rd	4th	
Market price/value	0.078	3.068	5.858	7.819	16.823
Production cost	3.602	1.147	1.955	2.886	9.590
Labour					
1. Rhizome cutting collection	0.385	-	-	-	0.385
2. Nursery & site development	0.462	-	-	-	0.462
3. Nursery maintenance (2 month)	0.308	-	-	-	0.308
4. Pit digging and rhizome planting(324nos)	0.462	-	-	-	0.462
5. Fencing the experimental plot (bamboo post)	1.000	0.300	0.800	1.500	3.600
6. Weeding & mulching (2 times/year)	0.231	0.231	0.231	0.231	0.924
7. Harvesting & drying (once/year)	0.154	0.616	0.924	1.155	2.849
Materials (Fine sand, spade, stake):	0.600	-	-	-	0.600
Labour + Material =	3.602	1.147	1.955	2.886	9.590
Net returns/ Net income =	(-)3.524	1.921	3.903	4.933	7.233

B/C ratio at 10% AIR = 1.61; B/C ratio at 15% AIR = 1.54; B/C ratio at 20% AIR = 1.48

From the above mentioned results and discussions it is clear that broom grass cultivation is a good profitable enterprise. Though, broom grass is a perennial, high value, non-perishable cash crop and has great economic potentialities in the economy of the country especially in hilly areas. It is urgent need to domesticate through introduce rhizome cutting plantation techniques in the hilly areas and create employment opportunity for male and female of the country and play a vital rule for poverty reduction.

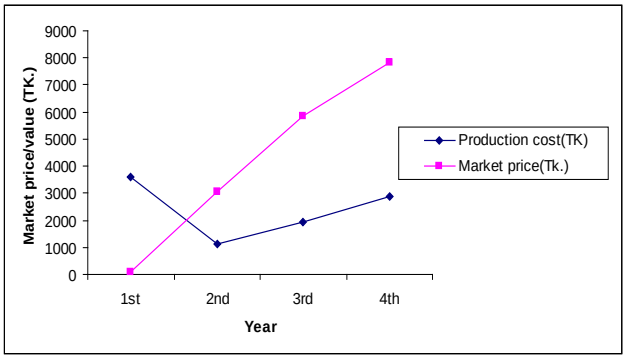


Fig. 3. Year wise production cost and market price/value (Taka) of T maxima.

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References

Alam, M. J., Mohiuddin, M. and Haider, R. 2010: Cultivation of Broom Grass. SAARC AgriNews. 4 (2): 7-8

Alam, M. J. 2007. Sambabanamoi pannya *Phooljharu. Krishikatha* 218-219.

Bakht, Z. 1984. Entrepreneurship in Bangladesh rural industries. Bangladesh Development Studies. X11(1&2): 25-58

Bhuchar, S.K. 2002: Ph. D. thesis Kumaun University, Nainital, India.

Das, D. K. 1990. Forest trees of Bangladesh. Bulletin 6. Plant Taxonomy Series. Bangladesh Forest Research Institute, Chittagong, pp. 9.

Khan, B.M., Huda, S. M. S. and Hossain, M. K. 2003: Role of Broom grass(*Thysanolaena maxima* Roxb.) Based Cottage Industry on Rural Development of Bangladesh: The Case of Hathazari Thana Under Chittagong Districts. Int. J. Usuf. Mngt.4(1): 35-39.

Kibria, M. A., Sarkar. D. C., Hossain. M. A. T., Mannan. M. A. and Islam, S. S. 2000. Forest Statistics of Bangladesh. Bangladesh Forest Research Institute. Chittagong. 119 p.

Mustafa, M.M. 1997. Gender roles in home garden management in Bangladesh. Chittagong University Studies, Part I I: Science, 21(2): 71-78.

Palni, L. M. S., Rikhari, H.C. and Sharma, S. 1999. Status and potentialities of enterprise development in natural-fibre based products in the Central Himalayan region of India. ICMOOD publication No. 99/2, Kathmandhu, Nepal.

Purohit, K. K. and Chowdhury, S.A. 1995: Marketing of Handicrafts: An Analysis of Some Related Issues. Journal of Rural Development, 25(2): 99-101.

Rai, L.C. and Sharma, E. 1994: Medicinal plants of the Sikkim Himalaya –Status, Use and Potential. HIMAVIKAS Occasional publication, G.B. Pant Institute of Himalayan Environment and Development, A lmora, India,

Standford, C. B. 1991. The Capped langur of Bangladesh: behavioral ecology and reproductive tracties. Contrib. To primatol. Vol. 26. Basel: S. Karger pp.1 – 65

Watson, R and Dallwitz, H.J. 1992: The Grass Genera of the World, 952-953.